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ABSTRACT

The Education Resources Center (ERC) is a community-based organization that serves students from various elementary schools united by the Phoenix Coalition for Youth and Families (PCYF). The PCYF Project was authorized to organize agencies and schools in the lower socio-economic areas of inner-city Phoenix into one collaborative arrangement. This study was undertaken to determine if a relationship exists between those cohorts who participated in the Family Math and Family Science programs offered by the ERC and their behaviors and attitudes towards these programs. Surveyed participants consisted of: first-, fourth-, and sixth-graders (n=164), parents (n=54), program instructors (n=8), and program instructor trainees (n=155). Participant observations, collection of school and program documents, and adult and child survey responses disclosed results that indicate a positive relationship between each participant and their behaviors and attitudes toward these programs. The positive adult evaluations of the program indicate their acceptance of the program and their desire to implement after-school classes in their communities. The paper includes copies of the Parent Survey (in English and Spanish), Child Survey (in English and Spanish), Family Math Evaluation, and Family Science Evaluation. (MKR)

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ED 376 049

The Impact of Family Math/Family Science Upon the Attitudes and Behaviors of Participants in the Valley of Phoenix from Fall of 1991 to Spring of 1993.

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Spring of 1993

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PREFACE

This research was conducted as part of an ongoing study to determine what factors influence student academic performance for the purpose of assisting community-based organizations' (CBOs) work toward improving student performance. To assist these CBOs, the goals of this researcher were to identify, define, and explain school academic performance in order to devise a working community model that explains this phenomenon. To complete these goals, the researcher identified, described, and explained how the Family Math/Family Science Programs, as a CBO representative, impacted teachers, community liaisons, parents, and children (between the ages of 6-14) within the community. The research objectives were to measure the impact of these programs upon the attitudes and behaviors of teachers, community liaisons, parents, and children from Fall of 1991 to Spring of 1993.

These cohorts participated in the programs in the environmental settings of the home, community, and school The *home setting* is where the parents instructed their children in mathematics/science. The *school setting* is where these certified instructors taught math/science to their parents and children. The *community setting* (i.e., South Mountain Community College) is where instructors, parents, and community liaisons trained to become certified Family Math/Family Science Instructors. For this study, The research question examined whether there was a positive relationship between those cohorts who participated (participants) in the Family Math/Family Science programs and their behaviors and attitudes in each program environment. Put another way, was there a positive relationship between each cohort's learning environment (the school, community, and home) and their attitudes and behaviors towards

math/science-among students, parents, instructors and community liaisons? That is, did those cohorts who participated in these programs develop corresponding positive attitudes and behaviors toward math/science? Along these same lines, critical theorists, such as De La Cruz (1989:3), similarly posited, are the elements of the child's home learning environment (the values, attitudes, and behaviors) compatible with the environments of the school and community? The alternate hypothesis (H1) stated a positive relationship between each cohort's participation in these programs and their positive attitudes toward math/science while the null hypothesis (Ho) stated no relationship between each cohort's participation in these programs and their positive attitudes toward math/science. To answer this interrogative, the researcher assessed the evaluation scores and survey responses of those cohorts who participated in these programs with their attitudinal responses to these programs.

In addition to testing whether a relationship existed between each cohort and the programs, this study also revealed the impact of the programs upon all cohorts. The impact assessment of all cohorts' attitudes and behaviors toward these programs was based on surveys and evaluation scores by the participants from Fall of 1991 to Spring of 1993. To complete this objective, the researcher used Rosier's (1978) conceptual framework to investigate specific causes of academic performance in the literature, school records, ongoing social agency documentation of activities, and home visits. To describe the home-learning environment, the researcher employed De La Cruz's (1989) definition which uses *elements*, known as the values, attitudes, and behaviors of the family (i.e., parents and children) to define this setting.

It is hoped this study's findings and recommendations will be used to educate school and CBO personnel about what factors influence students to perform exemplary in school. Accordingly, this study's findings will provide agency personnel with feedback as to what they can do to improve their methods toward promoting student academic excellence. For this study, I took on the roles of a "Research Analyst" and a "Change Agent"(Van Willigen 1986:5). In the former role, the researcher gathered and analyzed research data. In the latter role, the researcher "worked to stimulate change" in school academic performance by teaching classes at school to at-risk students.

ACKNOWLEDGEMENTS

The researcher wishes to express his gratitude to the students, faculty, and staff at the seven elementary schools in the Valley of Phoenix, who devoted their time and patience to this study. The researcher thank school district office administrators and the Education Resources Center's staff (Virginia Sterling and Julie M. Flores) for assisting and granting me permission to gather data about my cohorts. I am especially grateful to Dr. Santos Vega of the Hispanic Research Center (HRC), Arizona State University (ASU) and Dr. Yolanda De La Cruz of ASU West who periodically guided my research throughout the duration of this study.

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ABSTRACT

This investigation was undertaken to determine if a relationship existed between those cohorts who participated (participants) in the Family Math/Family Science programs and their behaviors and attitudes toward these programs from Fall of 1991 to Spring of 1993. Attitudes for this study were defined as "the values, attitudes, and beliefs that influence parents' decisions regarding behaviors . . . " (De La Cruz 1989:4). Behaviors are "the interactions and activities that are the mechanisms (or vehicle) through which children learn" (De La Cruz 1989:4). This study's population consisted of participant groups classified into the proceeding three cohort groups: students, parents, and program instructors. In this experiment, *participants* were designated as those cohorts who participated in a program. Participants were divided into the categories of adult and child. *Adult participants* included program instructors, parents, and community liaisons, while *child participants* included primary-grade students. The student population in this study reflected a representative sample because the researcher randomly surveyed a primary student population (n=164) composed of the first, fourth, sixth, and an assortment of primary grades during program classroom sessions at seven elementary schools in the Spring of 1993. The adult population in this study similarly reflected a representative sample because the researcher randomly surveyed program instructors (n=8) and parents (n=54). In a separate survey, the researcher surveyed those parents, community liaisons, and program-instructor trainees (n=155), who participated in one of a series of Family Math/Family Science training sessions, to evaluate these programs' impact upon participants.

The researcher employed a multi-method research approach to identify, define, and determine whether a relationship existed between cohort participation in each program and participant attitudes toward Family Math/Family Science. This approach involved employing descriptive and statistical techniques to devise, disseminate, and analyze data by cohort groups and their attitudes and behaviors toward Family Math/Family Science. Descriptive techniques consisted of participant observations, informal and formal interviews, and surveys with primarily students, some faculty, and a few community liaisons in the school and community settings. Separate surveys were administered to the following cohort groups: primary grade students, parents and/or program instructors, and program-instructors trainees.

In the study of family participants, statistical techniques consisted of cross-comparing each school's students (by grade level) and their parents' attitudinal and behavioral survey responses to De La Cruz's (1989) home learning environment "elements" to determine how the program influences student academic performance. In the study of the program's instructor-trainees, statistical techniques consisted of revealing their evaluation responses from the program's surveys. In the survey population as a whole, this high survey response rate of 164 child students, 62 parents and/or instructors, and 155 program-instructor trainees enabled the researcher to glean statistically significant results from the data.

After investigating what influences school academic performance in the literature, school records, and ongoing social agency documentation of activities, this study selected Rosier's (1978) conceptual framework. In his conceptual framework, Rosier employed an ecological model that

indicated school academic performance is influenced by the following blocks of environmental factors: the family, school, gender, and individual personality. Because Rosier's model did not include community-based organizations as a block that influences student academic performance, the researcher constructed the CBOs (such as the Family Math/Family Science Programs) to represent a block, and attached it to Rosier's model to demonstrate how programs influence school academic performance.

In classifying Rosier's model, it is deemed an eclectic one because it deployed both internal environmental factors (individual, age, school, and local culture/community) and external environmental factors (family, sex, and economic and political settings) to explain what influences student academic performance. The researcher is considering studying the family environment on a personal level as part of a future study. In this study,1990 United States Census Bureau data were used to described the family environment. Student, parents, and instructor responses to survey data were implemented to describe these internal and external environments. This revamped model enabled the researcher to provide CBOs' personnel with novel findings about what factors influence school academic performance.

To assist community-based organizations and school personnel in their goal to improve student academic performance, this researcher also devised recommendations from these findings to educate the former groups about those factors that influence school academic performance. Secondly, this study's findings will provide the CBOs' personnel with feedback concerning ways to improve their methods toward promoting student academic excellence. Equally important, the survey's findings

suggest ways for CBOs' personnel to recruit non-participants and to increase current participant attendance. Moreover, student and faculty survey responses that addressed evaluating the CBOs enabled the researcher to devise helpful future guidelines for CBOs. Lastly, it is hoped this study's criticism of CBOs will be perceived as constructive criticism, because the goal is designed to assist, not discourage, those CBOs who provide intervention services to elementary school students.

The study focuses on the Family Math/Family Science programs which the Education Resources Center (ERC) offers; ERC is a division of Valle del Sol, Inc. ERC is but one of nine community-based organizations which serve students from various elementary schools who were contractually united by the Phoenix Coalition for Youth and Families (PCYF) during the Spring of 1992. The PCYF Project was funded and authorized, as a grant, by the state of Arizona to organize these [presumed to be] fragmented agencies and schools in the lower socioeconomic areas of inner-city Phoenix into one collaborative arrangement (Waits 1991). This study focuses on Valle del Sol's Family Math program which has been offered to numerous schools throughout the Valley of Phoenix during the past six years, and to the Family Science program which has been offered during the past two years (1992-1993), and to the Bilingual Mathematics program (Matematicas), which was offered for the first time during this Spring of 1993. ERC targets primarily all public/private Phoenix Valley schools, (although there is some representation from other non-valley Arizona schools), to improve youth scholastic performance in math and science. This community-based organization operates in or near the school setting and the remaining two organizations operate in distant Phoenix Valley locations. Students who attend these on-based school

programs reside within the following valley cities: Scottsdale, Tempe, Mesa, Glendale, Chandler, and Phoenix.

For this study, the researcher performed both the roles of a *Change Agent* and *Research Analyst*. During this study period, this *Change Agent* not only encouraged students to complete elementary and high school, but also to consider college. This agent also acted as a Program Coordinator whose duties involved recruiting, coordinating, and disseminating program sessions for future program instructors, and after-school classes for parents and their children. In retrospect, this *Change Agent* engaged in advocacy anthropology by working on a personal level with instructors, community liaisons, parents, and children to further their interest in education, and to thereby advance student academic performance. As a *Research Analyst*, the researcher analyzed data from surveys, educational anthropology literature, field notes, and program literature.

Participant observations, collection of school and program documents, and adult and child survey responses disclosed results which indicated the relationship between cohort attitudes toward the programs and their attitudinal behavioral participation in each program. Statistical data collected through survey responses revealed that participants were content with the program. Adult and child cohort group responses to surveys indicated a positive relationship between attitudes toward math/science and student participation in CBOs. After assessing the statistical data results, the researcher discovered a statistical relationship between program participants and their positive attitudes and behaviors towards Family Math/Family Science. Lastly, a relationship across all

programs reside within the following valley cities: Scottsdale, Tempe, Mesa, Glendale, Chandler, and Phoenix.

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cohorts occurred with their attitudes towards learning Family Math/Family Science in each learning environment.

INTRODUCTION

Background for the Study

Throughout the nation, secondary schools are currently reporting higher minority enrollments (Mercer 1991:4); nevertheless, these figures are misleading because they do not show the high attrition rates and low graduation rates among Hispanic and African American high school students. In other words, Hispanic and African students are enrolling in school, but they are not remaining in school until high school graduation. To be specific, attrition rates vary significantly among ethnic minority groups. For example, of those 1980 high school graduates who enrolled full-time in two-year colleges, Asian Americans attained the highest retention rates while Native Americans, Hispanic Americans, African Americans, and the student population as a whole achieved lower retention rates (Mercer 1991:4). Moreover, "the [national] percentage of Black and Hispanic high school graduates enrolled in college declined dramatically between 1976 and 1988" (D. Carter 1990:1), yet minority populations grow at rates that exceed the dominant Anglo population's. In short, Hispanic and African American students experience higher attrition rates than whites and Asians.

STATEMENT OF THE PROBLEM

The high dropout rate trend among minority students nationwide is similarly apparent in South-Central Phoenix. "Nationally, Arizona ranks forty-seventh for high school graduation rates; in Arizona only 64% of high school students graduate while the national rate is 72% (American Federation of Teachers, 1989 in C. Carter 1990:9). According to Carter

(1990:9), "[Arizona] State averages do not reflect local demographics and they may trivialize the magnitude of the dropout problem when such data are compared to data from . . . the local school district." For instance, in a nine-year period, from 1977 to 1986, the percentage of students who were promoted from Murphy Elementary District and who subsequently graduated from the Phoenix Union High School District after four consecutive years of high school decreased from 60% to 32% (C. Carter 1990:9). Furthermore, the reported elementary school dropout rate for Maricopa County is 10%, yet this rate was twice as high in the inner-city of Phoenix [20%] (Waits 1990). These dropout rates provided the impetus for this researcher's original focus; however, this researcher, nor past researchers (such as C. Carter 1990) could locate and interview a significant population of dropouts. Thus, school failure is apparent, yet what courses do America's elementary students fail?

According to C. Dianne Bishop, Arizona Superintendent of Public Instruction, 'Our entire country is not producing students who can solve problems with mathematics' (Bishop 1993 in Schultz 1993:B1). For the state of Arizona, the student survey results of the National Assessment of Educational Progress state "Only 13 percent of Arizona's fourth graders and only 19 percent of eighth graders are mastering the kind of math expected for their grade levels" (Schultz 1993:B1). To make matters worse, there is also disparity in academic performance among ethnic student groups (Figure 1) Nationwide and statewide, minority groups underperformed their Anglo counterparts. For example, "In [the] fourth and eighth grades, Arizona's Anglo students tended to outperform black, Hispanic, and Native-American Students" (Schultz 1993:B4). Thus, educators are aware of these findings, but what can they do to alleviate

this festering problem? In the researcher's opinion, the traditional U.S. teacher-center oriented approach has failed to educate its youth. This approach failed because it emphasized an individualistic learning style that was not compatible with the minority learning styles of Hispanic Americans, Native Americans, and African Americans. Instead, these minorities practice a group learning style (collective learning) (Philips 1983). These groups rely on a family network for academic and social support, rather than solely on schools for support. But replacing the individualized learning style with the group style in itself will not improve student academic performance, educators also need to change the traditional curriculum.

Traditionally, educators have employed math curriculum that stresses rote drills, which have been criticized by numerous educators as ineffective teaching techniques. One such critic, C. Diane Bishop states "You've got a [traditional math] curriculum that still emphasizes rote drill and practice" (Schultze 1993:B1). The other disadvantage about rote-memory techniques is they are time consuming and require students to repeat something over and over again. Instead, students should use associative memory which is more reliable because it lets students tie two abstract concepts together. In addition to implementing new curriculum and techniques, many educators advocate community-based education (CBE).

The Family Math/Family Science Program

One such CBE organization, is "Valle del Sol which is a participating member of the National Association for Community-Based Education and a founding member of the Hispanic Network for Community-Based Education . . . "(ERC 1992a:4). The study focuses on the Family Math/Family Science programs that Education Resources Center (ERC) offers; ERC is a division of Valle del Sol Inc., (see Figure 2). ERC endorses a community-service approach toward education in a variety of settings, including homes, churches, public libraries, and community organizations. Thus, community involvement is promoted.

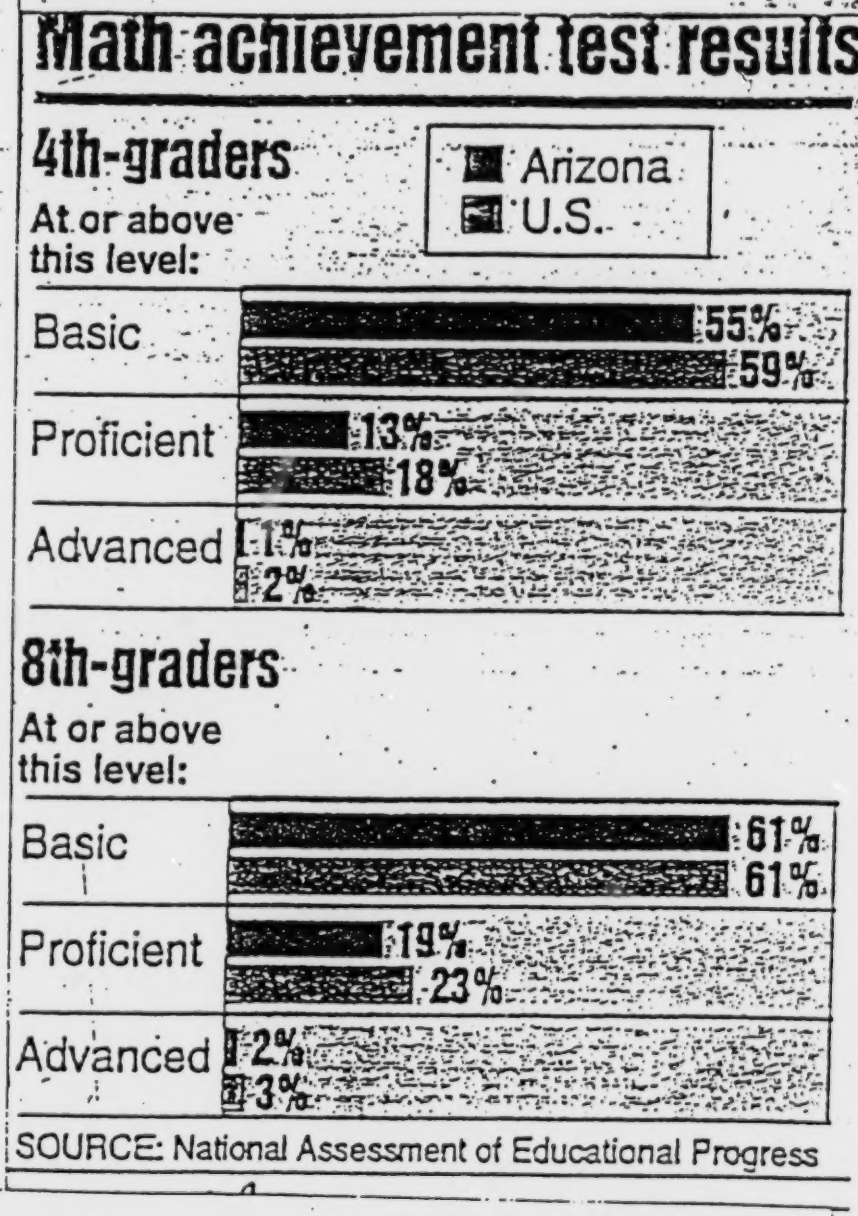
ERC is one of nine community-based organizations which serve students from various elementary schools, and who were contractually united by the Phoenix Coalition for Youth and Families (PCYF) during the Spring of 1992. The PCYF Project was funded and authorized, as a grant, by the state of Arizona to organize these [presumed to be] fragmented agencies and schools in the lower socioeconomic areas of inner-city Phoenix into one collaborative arrangement (Waits 1991). The Family Math program has been offered to numerous schools throughout the Valley of Phoenix during the past six years, the Family Science program has been offered during the past two years (1992-1993), and the Bilingual Mathematics program (Matematicas), was offered for the first time during the Spring of 1993. ERC targets primarily all public and private Phoenix Valley schools, (although there is some representation from other non-valley Arizona schools), to improve youth scholastic performance in Family Math and Family Science. Community-based organizations (CBOs) operate in or near the school setting. Students who attend these on-based school

programs reside within the following valley cities: Scottsdale, Tempe, Mesa, Glendale, Chandler, and Phoenix.

Education Resources Center of Valle del Sol, Inc. plans, organizes, and conducts at least four workshops annually (two each for Family Math and Family Science). During these workshops, consultants (veteran math and science instructors) teach certified elementary and high school teachers how to conduct classes in school districts statewide. Parents and community liaisons are also taught how to preside over classes. Presenters at these workshops provide educators and parents with hands-on and visual techniques which enhance their abilities to teach science and math to multicultural student populations who learn collectively. Some instructors apply these collective teaching techniques to their regular classes as well as their after-school classes. These instructors' students develop an increased level of awareness and participation in science and math (ERC 1993).

Besides administering the workshops, ERC monitors the Family Math/Family Science program year-long, identifies ways to improve it, recruits teachers for workshops, and interacts with school districts to identify parents and children to attend classes (ERC 1992b).

Figure 1



In Arizona Republic/Phoenix Gazette. April 9, 1993 (B1). By Ray Schultz. "Few Arizona Pupils Proficient in Math Skills, Report Shows. Adapted figure.

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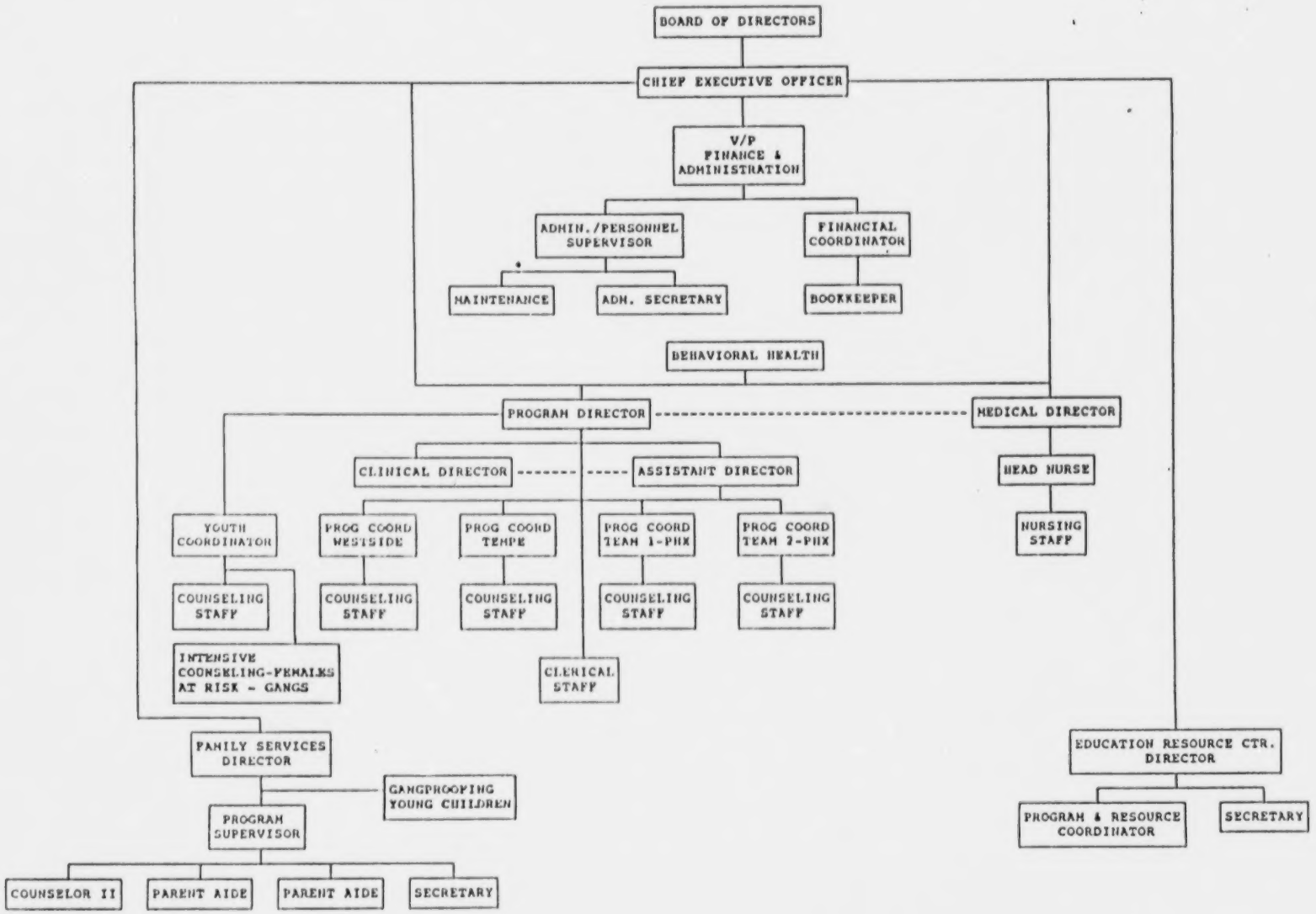
Figure 2

AGENCY ORGANIZATIONAL CHART
Valle del Sol, Inc.



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Target Population

These programs address the high dropout rate among Hispanic students, their fear of failure in both math and science, lack of opportunity for parents and their children to engage in quality time together in programs in which they can excel, unsatisfactory parent/child(ren) interaction in homes, and career opportunities for those with skills in math and/or science (ERC 1992b). Parents and children who attend Family Math/Family Science classes are typically Hispanics from impoverished or near-impoverished environments. They reside in the Central Corridor/South Phoenix areas which comprise the Phoenix Elementary, Roosevelt Elementary, Wilson, Isaac, and Murphy School districts, among others (ERC 1992b). The program's objective is to unify the students of these schools with their parents in settings that field educational activities.

Family Math/Family Science bring parents and children together as a unit to learn course content (kindergarten through 12th grade) in an environment which fosters educational achievement. In addition to learning math and science in the school setting, parents and children learn more about themselves, an outcome that usually produces more interaction in homes (ERC 1992b).

After-school classes in Family Math/Family Science prepare children for greater success in school, increase their self-esteem, self-image, and positive decision-making skills, and improve their chances of graduation from elementary and/or high school. The program's staff maintain that increased success in homes and schools will likewise decrease the students' motivation to join gangs (youth groups). Commensurate with this staff's perception of the student environment, this researcher

likewise believes that the student academic environment is not limited to the school, but instead encompasses the multiple environments of the home, school, and community. As a result, this researcher chose to study what environmental factors influence school academic performance, rather than focus solely on the isolated school-micro environment.

Targeted Population's Environmental Context

These elementary students' academic performance in South Central Phoenix schools remained constantly low during the 1980s even though various community-based organizations (CBOs) have historically provided services to these children. To be specific, student progress reports and basic skills test scores remain low, absenteeism continues, and school dropout is common. Juvenile crime is often violent, substance abuse is prevalent, and teenage parenting is an accepted way of life among these youth. Because all these students experience two or more of the previous risk factors, they are considered at-risk (Waits 1990:4). In sum, risk factors and declining educational trends continue despite the fact that a variety of social service programs and activities are available to these inner-city youth.

In evaluating educational trends and social service providers, Waits (1990), a PCYF Project Leader, notes these programs offer divergent services, which as a group resultantly produce disunification. Waits (1990) states modern efforts by schools and agencies to provide academic enhancement services to children are splintered. In the past, each agency in South-Central Phoenix typically operated independently until the formation of the PCYF in April of 1992. The PCYF seeks to unify and develop relationships between these divergent agencies and schools to better serve the needs of youth at risk in inner-city Phoenix. The PCYF

seeks to lower the school dropout rate, delay teen pregnancy and improve teen parenting, reduce substance abuse, reduce gang involvement, and to encourage positive continued involvement in community and teen leadership activities. Until 1992, there was no consolidated agency effort to reduce the preceding risk factors facing youth and families. According to PCYF's records, "99% of the children are impoverished, 92.3% are on A.F.D.C., 96% received free lunches, the high school drop-out rate is 73% and the minority population is 92.5%." For the purpose of this paper, the researcher, like the PCYF, is primarily concerned with reducing the school dropout rate through community-based educational intervention activities. To pursue this, the researcher employed an analysis of the participants' attitudes toward these programs and their behavioral participation in these programs. Just as importantly, since the Family Math/Family Science programs' inception, what impact has it had on student academic performance?

Goals of Study

The goal is to determine if there was a relationship between school academic performance and each cohort within each program's learning environment. The researcher investigated school academic factors for the purpose of assisting community-based organizations and school officials in their work toward improving student academic performance. Because of high dropout rates among Phoenix inner-city elementary students, this study addresses those factors that explain this poor academic phenomenon. To be geographically specific, the researcher studied those environmental factors that influenced school academic performance among cohorts who reside near seven elementary schools in the Phoenix Valley.

Objectives

This investigation was undertaken to determine if a relationship existed between those cohorts who participated (participants) in the Family Math/Family Science programs and their behaviors and attitudes toward these programs from Fall of 1991 to Spring of 1993. Indirectly, this objective also identified, described, and explained how these programs impacted students (between the ages of 6-14) academic performance at seven elementary schools from Fall of 1991 to Spring of 1993.

To complete this objective, the researcher employed Rosier's (1978) conceptual framework to investigate specific causes of academic performance in the literature, school records, ongoing social agency documentation of activities, and home visits. It is hoped this study's findings and recommendations will be used to educate school and social agency personnel about what factors influence students to perform well in school. This study's findings will provide agency personnel with feedback as to what they can do to improve their methods toward promoting student academic excellence.

Limitations of the Study

This study is limited in several ways:

1. After conducting a literature search, this study did not reveal a model that considered how community-based organizations influence a student's academic performance. Along these same lines, Rosier's (1978) model likewise did not show how community-based organizations (programs) as an environmental component influence school academic performance, so the model was altered to include the Family Math/Family Science Programs as another environmental component that influences student academic performance (see Figure 3).

2. All program instructor-trainees were surveyed at the closing of one of the Family Math/Family Science workshops or training sessions. This means adult participants were surveyed at different after-school class sessions and at different time periods. For example, the researcher surveyed some participants at the close of their first class session, and others at the close of their fourth class session. Nevertheless, all family participants engaged in Family Math/Family Science activities prior to the completion of their surveys. Thus, adult participants received exposure to the program's activities before they responded to their surveys.

3. The researcher was limited to one semester of study at each school, which prevented him from observing the full duration of an academic year. Thus, the researcher analyzed agency documents, and school records to obtain information for the full duration of this study.

4. The researcher did not formally interview ERC staff and the staff of the schools where students completed surveys, so the researcher usually did not get their input about the questions which addressed teachers, parents, and children. To be precise, the researcher recorded problem areas found in both the school and family environments. Therefore, the researcher did not formally receive the ERC staff's version of these problem areas.

5. Because the last two blocks of Rosier's (1978) conceptual framework reflect school-related personality characteristics at ages 14 and 16, the researcher adjusted these characteristics to fit six to 12 -year-old personalities.

Figure 3

Adaptation of Rosier's (1978:168) model

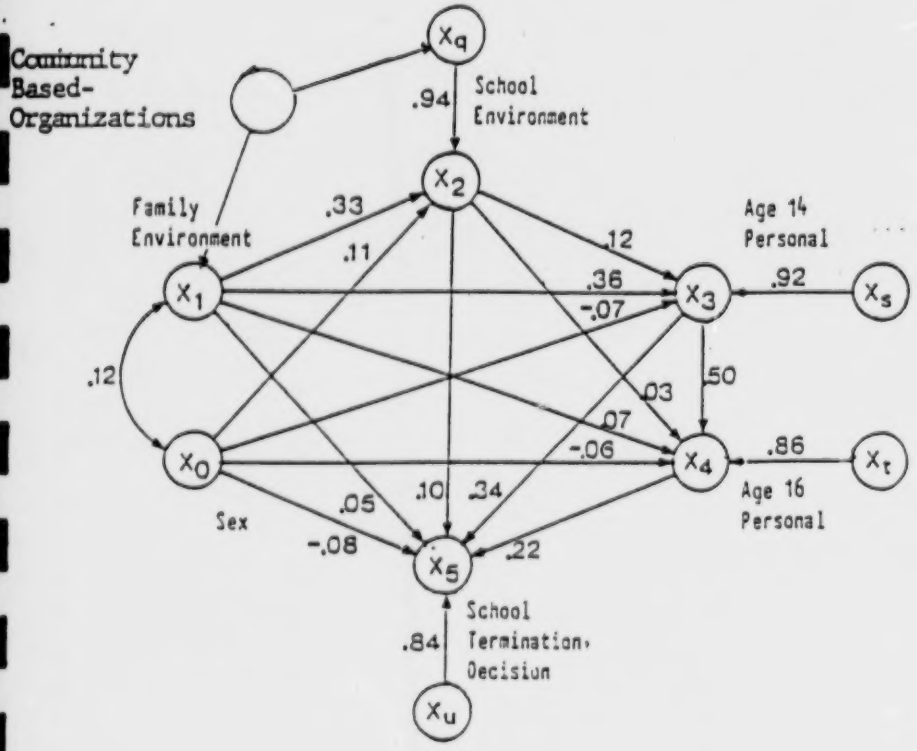

Figure 10.2 Path diagram for the basic causal model of the school termination decision with median values of the estimated path coefficients for the six states.

Definitional Concerns

For this paper, American minorities include African Americans, Asian Americans, Native Americans, and Hispanic Americans. "Hispanics are those individuals whose declared ancestors or who themselves were born in Spain or in the Latin American countries" (Portes and Truelove 1987:402). The term *Hispanic* encompasses all races, and therefore is best defined as a multi-cultural concept, rather than an exclusive racial one. In other words, Hispanics have more cultural similarities, than racial ones. (Most cultural anthropologist do not believe that racial classifications exist (Nanda 1991).) No other cultural traits better classify Hispanics than their tendency to be of the Catholic denomination and Spanish speaking. Most Hispanic Americans are classified as either Chicanos, Puerto Ricans, or Cubans. The remaining non-Hispanic groups are classified according to their ethnic and/or biological origins (African Americans, Anglo Americans, Asian Americans and Native Americans).

This study's population consisted of participant groups classified into the proceeding three cohort groups: students, parents, and instructors. In this experiment, *participants* were designated as those cohorts who participated in a program. Participants were further divided into the categories of adult and child. *Adult participants* included program instructors: teachers, parents, and community liaisons while *child participants* included primary grade students (grades first, fourth, and sixth). This study also defined teachers as instructors, and staff as those school personnel who do not usually teach. The student population in this study reflected a representative sample because the researcher randomly surveyed an elementary student population (n=157) of the first, fourth, and sixth grades during program-classroom sessions at seven

elementary schools in the Spring of 1993. The parent population of this study similarly reflected a representative sample because the researcher randomly surveyed parents and/or instructors (n=62) and program-instructor-trainees (n=155). But what attitudes prompt these cohorts to behave the way they do towards mathematics and science? To find these prompts, we need to define human attitudes and behaviors. Attitudes for this study were defined as "the values, attitudes, and beliefs that influence parents' decisions regarding behaviors . . . " (De La Cruz 1989:4). Behaviors are "the interactions and activities that are the mechanisms (or vehicle) through which children learn" (De La Cruz 1989:4). Each cohort expresses their attitudes and executes their behavior in an environmental setting.

The researcher employed De La Cruz's (1989:2) definition of the home environment, which uses "home process variables that cover a broad range of psychological, attitudinal, structural, and behavioral aspects of the home and of the parents' relationships with their children. These variables emphasize what parents do with their children, rather than who the parents are in a 'societal' sense (i.e., parents' education, income occupation, ethnicity and the like)" (De La Cruz 1989:2). To define the school environment, the researcher employed Rosier's (1978) definition, which delineates it as the confines of the school campus. Because the literature did not reveal a definition for CBOs, the researcher devised one. CBOs are defined as those organizations which provide social/academic support to a community's inhabitants. Because ERC provides social/academic support to the community, the organization is designated a CBO.

In a separate survey, the researcher surveyed those parents, instructors, and teachers, who participated in one of a series of Family Math/Family Science instructor- training sessions, to evaluate these programs' impact upon adult participants. Unfortunately there is little educational anthropological literature that examines CBOs, but there is literature about explanations of student academic performance by ethnicity.

REVIEW OF RELATED LITERATURE

In the field of educational anthropology, there are numerous theories that explain what influences poor academic performance. Most of the anthropological literature on explanations of minority student academic performance is found in minority high school ethnographies, which lack research design. Since the 1960s, educational anthropologists devised numerous explanations for minority student attrition and school performance which lead to a theoretical debate. For instance, various "micro" ethnographers proposed a "cultural difference" theory during the 1960s while "macro" ethnographers John Ogbu (1978) and Douglas Foley (1990), respectively, produced the theories of the "Caste" and "Capitalist Racial Order."

Theories of minority school failure can be classified as external explanations (i.e., macro) or internal explanations (i.e., micro). Proponents of internal explanations say that poor academic performance is caused by cultural differences between minority and Anglo school settings (Gibson 1988; Cazden 1972; and Model 1988). Model et. al., (1991) argue that each culture promotes unique internal factors (values) that are transmitted to its internal ethnic group. These values make up a pattern that is describable. Each culture's distinct array of values produce unique behaviors that either complement or conflict with the Anglo-

Protestant ethic. Advocates of external explanations, on the other hand, exclaim that poor minority school performance is attributed to factors outside of culture such as the economy, politics, and racial discrimination (Foley 1988, 1990; Ogbu 1978, 1981, 1987; Portes and Truelove 1981; Steinberg 1981; Zinn 1989; Hershberg 1991; and Cox 1948).

However, these studies are long on theory and short on methodology. That is, they do not provide applied researchers with a theoretical model and an accompanying operational methodology to follow and implement them. This opinion is shared by Wilcox (1982:478) who posits, "There remains a number of areas in which [educational-anthropology] theory and practice are underdeveloped, to the detriment of progress in both scholarly and applied work."

Although the educational anthropological literature did not produce an employable model with an accompanying operational methodology, the researcher did find these guides in the educational literature (see Rosier 1978). Rosier's operational model was selected because it is similarly compatible with Educational Resources Center's (ERC) holistic goals toward improving student academic performance. That is, Rosier (1978) like ERC personnel, believes a student's academic performance is influenced by the environments of the school, family, community and his/her personality factors. For classification purposes, the researcher considered Rosier's model an eclectic one because it utilizes internal environmental factors (school and local cultural setting) and external environmental factors (economic and political setting) to explain what influences student academic performance.

After investigating what influences school academic performance in the literature, school records, and ongoing social agency documentation of

activities, the researcher structured this study mostly around Rosier's (1978) conceptual framework. In his conceptual framework, Rosier employed an ecosystem model that indicated school academic performance is influenced by the following blocks of environmental factors: the family, school, gender, and individual personality. Because Rosier's model did not include community-based organizations as a block that influences student academic performance, the researcher constructed the CBOs to represent a block, and attached it to Rosier's model to demonstrate that programs influence school academic performance. This revised model enabled the researcher to provide the CBOs' personnel with novel findings about what factors influence school academic performance.

METHODOLOGY

Conceptual Framework for this Study

In this study, the researcher employed Rosier's (1978) conceptual framework to assess the impact of the Family Math/Family Science program upon adult and child participants. This conceptual framework ". . . is based on the assumption that there were two major sources of effects influencing a young person's school person termination decision" (1978:17). The first source, which is external to a person, was the range of different environments within which he moved. Rosier considered the family and the school as the most influential student environments. The next major source of influence, internal to a person, was a set of personality characteristics (a psyche). In sum, Rosier identifies four blocks of dropout factors in a causal sequence. The first two blocks reflect family and school environments as sources of significant others; the other two blocks reflect school-related personality characteristics.

Due to time constraints, the family environment block of factors was classified as a controlled independent composite variable because the researcher concentrated on the school setting. Rosier's conceptual framework was used to address the research question.

The research question examined whether there was a positive relationship between those cohorts who participated (participants) in the Family Math/Family Science programs and their behaviors and attitudes toward these programs. Is there a relationship between students with supportive scholastic environments and student positive attitudes toward school. In essence, do students in supportive scholastic environments develop positive attitudes toward school? If so, educators believe these positively motivated students will excel in school.

Because educational research findings (De La Cruz 1989; Philips 1983) indicate that conducive learning environments motivate students to excel in school, the question is, do the learning environments that this CBO created positively stimulate students to progress in school? This study's main hypothesis and subsequent three sub-hypotheses tested for a relationship between the learning environments of the student and his/her attitude toward school achievement. To address these hypotheses, this researcher employed a multi-method research approach.

Research Design

This study implemented a multi-method research approach to identify, define, and determine whether a relationship existed between the attitudes of each cohort group and their behavioral participation in the Family Math/Family Science programs. This approach involved employing descriptive and statistical techniques to gather, analyze, and compare data between each cohort group.

Statistical Techniques

This study used statistical techniques to analyze quantitative data. Statistical techniques consisted of comparing each cohort's attitudes to these program to determine if a relationship existed between student attitudes toward these programs and each cohort's participation in these programs. The high student survey response rate of (n=109) enabled the researcher to derive statistically significant results from the data.

Descriptive Techniques

Descriptive techniques consisted of participant observations, informal and formal interviews, and surveys with primarily students, some faculty, and a few administrators, all in the community setting. For this study's descriptive data, the researcher used Spradley's (1980) developmental research sequence of 12 steps to conduct participant observations and informal interviews with the parents, students, and instructors at seven elementary schools and social agency staff. This paper is structured around the proceeding school informant domains: the students, parents, teachers, and CBO staff. A descriptive record was kept during the first days of observations about the school classes and the school at large. After completing these descriptive observations, the researcher recorded general observations, and then moved on to, consecutively, take focused and selective ones.

Instrumentation

Three separate surveys were administered to each cohort group. Parent participants received survey (Appendix A) and children received survey (Appendix B), while program instructor-trainees received survey (Appendices C and D).

Parent participant responses to survey questions were used to answer the following primary question categories as adapted from the six elements devised by De La Cruz (1989:3):

(1) "[Do] parents value the subject-area themselves and model some knowledge or interest in learning more about the area[?]"

(2) "[Do] parents value the child's learning in that subject: learning the subject is something that is valued at home[?]"

(3) "[Do] parents believe the child can (i.e., 'has the capacity') to learn the subject[?]"

(4) "Are family interactions and resources in the home 'appropriate for' and 'responsive to' child's interests and skills in the area?"

Child participants' responses to survey questions were used to answer the following primary question categories:

(1) "Does the child value Family Math and seek to learn more about the subject?"

(2) "Do the children think their parents value learning the subject area at home?"

(3) "Are the children's interactions and resources in the home 'appropriate for' and 'responsive to' child's interests and skills in the area?"

The responses of those adult participants (who attended the instructor-trainee program sessions) to survey questions were used to answer the following primary question categories:

(1) Evaluate the presentation of the program's activities?

(2) What changes would you recommend for future workshops?

Responses of parent participants and those child participants who attended the after-school classes were likewise used to evaluate the Family Math/Family Science programs. They answered the following primary question categories:

Researcher asked parents':

(1) "Evaluate the Family Math/Family Science activities?"

Researcher asked children:

(1) "How would you rate these programs?

To answer these categories, the researcher asked the cohorts to answer a series of survey questions that pertained to each category.

Data Gathering

This researcher devised novel surveys for child and adult informants on campus. To facilitate data-gathering in a controlled environment, informants were interviewed at designated times and locations at school. In other words, scheduled informal interviews were conducted with instructor informants, and surveys were distributed to students "solely" in the classroom. In this study, any teacher and classroom of students who were available and willing to complete a survey were interviewed. Consequently, the researcher interviewed most program instructor trainees (n=155), and disseminated surveys to some of the first, fourth, and sixth grade students and an assortment of student grade levels at seven of these elementary schools (8 of 86 classes) (Table 1). The adult informants were interviewed (instructors, CBO staff, and parents) at various locations. Campus locations included the classroom and cafeteria while off-campus ones included the CBO office and South Mountain Community College's student union rooms. Next, during initial interviews,

the researcher posed open-ended questions to informants to ascertain all possible responses to these queries. Informant responses to open-ended questions were used to devise focused questions, which in turn became part of the final survey versions. After the informants answered these questions, the researcher asked them to explain why they held their views. Because responses came from a variety of school informants, this researcher was able to determine how all the domains evaluated this community-based organization. These questions led to numerous other questions and follow-up interviews with informants.

For this study, the researcher spent six hours a day, five days a week examining the community-based organizations and school component at their corresponding sites; however, during office hours, the author often remained throughout most of the entire day and worked at other tasks. This additional site time enabled the researcher to obtain more insight about the settings of the CBO and school, which supplemented this study's fieldwork duration. The researcher devoted approximately 700 total hours to this study which commenced in January of 1993 and terminated in May of 1993. Nevertheless, this researcher, as an employee of ERC, continues to gather more data for a future ongoing longitudinal study of this CBO's programs. Observations and occupied one-third of the total time, while the surveys and research analysis consumed the remaining time portion. All of the informants' real names were replaced with pseudonyms to protect their identities.

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TABLE 1

Tally of Elementary Students by Grade, School. Number of Classes, Total population by Grade, and Sample Population and Percentage.

Grade	School	# of Classes	Total pop.	SamplePop.	%
1st	Shaw Butte	7	153	21	13.3
1st	Bethune	3	75	16	21.3
4th	Rio Vista	3	73	21	28.7
4th	Sullivan	3	74	14	18.9
6th	Rio Vista	2	41	17	41.4
Mixed+	Squaw Peak	12	549	12	00.02
Mixed+	Roselane	20	509	37	07.26
Mixed+	Wilson	36	539	18	03.33

Note: Table created by James A. Jaramillo (5/10/1993).

Source: Schools listed above.

Sample School Population

This surveyed school population consisted mostly of the first, fourth, and sixth grade students from seven of these elementary schools (8 of 86 classes) in the Valley of Phoenix (Table 2). Student proportions by ethnicity and socioeconomic level varied from school to school. The researcher surveyed four of the seven schools' student populations by grade level while surveying the remaining ones by assorted grade levels.

Research Question Strategy

This study sought to determine how the attitudes of the adult and child participants in the program's self-created environments influenced student body achievement. (This study seeks to show how the attitudes of adult and child participants motivate student achievement.) This study used this hypothesis to supplement and correlate with Rosier's (1978) environmental variables. This study deemed the relationship between the attitudes of each cohort group within each environment (participants) as separate sub-hypothesis variables. This study in turn designated each sub-hypothesis as a proposition; each proposition then corresponded to a learning environment.

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Table 2

Tally of Elementary Students by Grade, School, Number of Classes, and Ethnicity.

Ethnicity
KEY: H=Hispanic Amer./ AA=African Amer./ NA= Native American
AGA= Anglo American/ ASA=Asian American.

Grade	School	# of Classes	HA	AA	NA	AGA	ASA
1st+	Shaw Butte	7	150	38	39	135	13
1st	Bethune	3	38	22	3	2	2
4th+	Rio Vista	3	496	21	3	63	0
4th	Sullivan	3	52	6	0	7	0
6th+	Rio Vista	2	496	21	3	63	0
Mixed+	Squaw Peak	12	195	52	26	364	13
Mixed+	Roselane	20	63	22	17	506	13
Mixed*	Wilson	36	461	20	24	34	0

Note: += Total student count by ethnicity of all elementary grades. Nevertheless, each school's informant indicated each grade's population by ethnicity is comparable to the school's population as a whole.

*= Inclusive to grades K-4 of school student population.

Table created by James A. Jaramillo (5/10/1993).

Proposition 1: Family Environment and Parent Attitudes

This study used 1990 United States Census Bureau data to describe the family environment's socioeconomic characteristics. "For this study, the family environment was defined to include parents, siblings, and other relations" (Rosier 1978:60). These persons acted as significant others, and performed two roles; in a passive role as models or in an active role by influencing a child's schooling. Passive role factors comprised the cultural and intellectual level of the student in the family environment. This study measured two of Rosier's family environment variables: the Socioeconomic Level and Parents Interest. In his summary of the first variable, Rosier (1978:60) asserts, as a family's Socioeconomic Level increased, there was a decrease in the percentage of dropouts in each category of the variable measuring educational attainment. Although this study could not apply this test to the student population, the researcher was able to use 1990 U.S. census data to determine student household and family mean-income levels of one predominantly populated Hispanic student school populace in South Central Phoenix. The household income formed a three-tiered hierarchy based on three different tracts where the Jones Elementary students reside. (see Table 3).

Table 3.
Mean Household and Family Income of Students, 1990 U.S. Census:

Tract	Block Group	Household Income	Family Income
1144	2	$18,597	$21,580
1147	2	$8,081	$8,246
1143	4	$14,751	$15,313
Grand Mean		$13,809	$15,046

Source: U.S. Census, Arizona State Date Center (1990:).
(Illustrated by Jaramillo 1992)

In reviewing Table 1, the grand means of student family and household incomes in 1990 indicated these students reside in poverty. Thus, when these impoverished income levels are compared to Rosier's (1978) assertion that high family socioeconomic levels correspond to lower dropout rates, these students would be expected to drop out, rather than to graduate.

Rosier (1978:61) reported an association between students with supportive home environments and student retention in school. In the second home environment variable, Parent Interest was an active role variable designed to measure the level of interest displayed by parents in school-related activities of their children. This proposition asked, was there a relationship between the parents' home learning environment and their interest to learn math? To determine if this study's parent environment was associated with a supportive student environment, the researcher asked parents a series of survey questions which pertained to a primary research question category/proposition (adapted from De La Cruz 1989). The first proposition stated: do parents value the subject-area themselves and model some knowledge or interest in learning more about the area?

Proposition 1a: Parents' Interest toward Math.

In testing this proposition, the researcher's first question asked parents "Which part of these sessions (after-school classes) was most beneficial to you? All the parents (n=4 of 4) from Shaw Butte School responses indicated the parents' interest to learn more about math. These favorable responses included (a) "parent and child learn together (n=4), (b) knowing child's level of math understanding is important (n=1), (c) Repetition of math skills with fun activities (n=1), (d) activities that

focused on what was previously learned during regular class (n=1), (e) child participation and games (n=2) and (f) all sessions were beneficial (n=1)." In conclusion, these parents demonstrated interest toward math.

Proposition 1b: Is Family Math important to you?

Like the previous proposition's results, the parents responded math was important to them. Most of the school parents from Shaw Butte (n=4 of 4), Squaw Peak (n=10 of10), Roselane (n=20 of 24), and Wilson (n=3 of 3) replied affirmatively ("yes") that Family Math/Family Science was important to them (see Chart 1). In conclusion, all parents indicated interest towards math. To understand their responses, I asked parents, "If Family Math/Family Science is important to you, why is it important to you?" This new question became survey question 1c.

Propositions 1c: If Family Math/Family Science is important to you, why is it important to you?

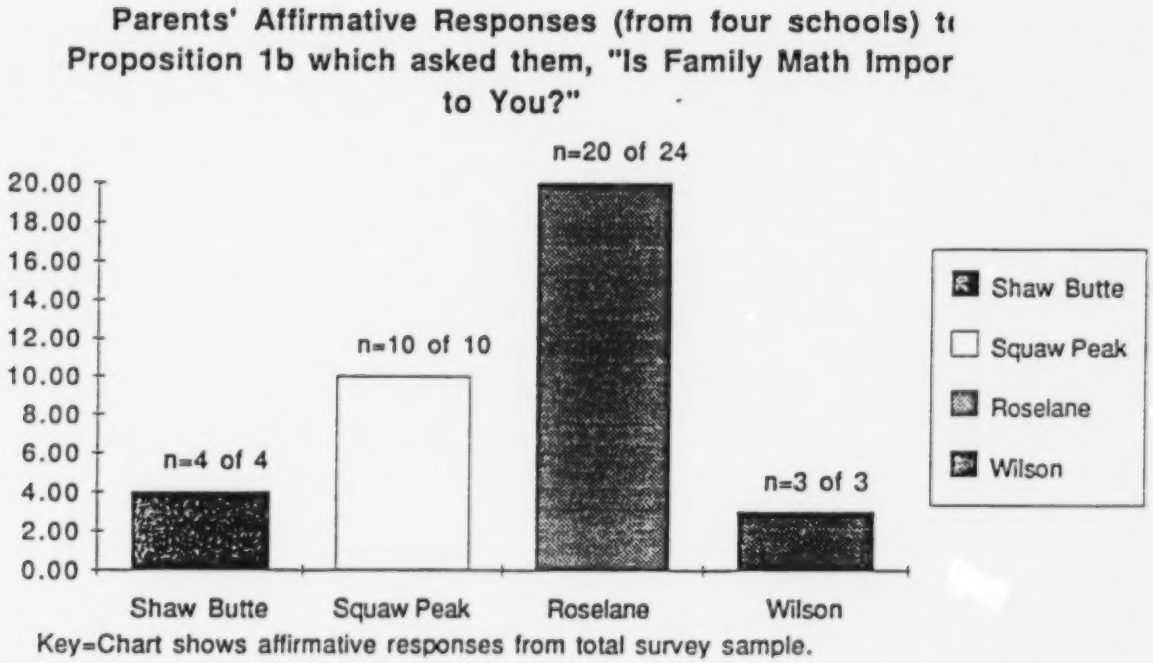
Like the former proposition's results, these parents responded positively about Family Math/Family Science's importance to them. All the parents from Shaw Butte (n=4 of 4), Squaw Peak (n=10 of 10), Rio Vista (n=24 of 24), and Wilson (n=3 of 3) gave explanations that demonstrated their interest in math/science. The parents of Shaw Butte's responses included (a) "it [this subject(s)] stimulates your desire to learn (n=1), (b) it helped me brush-up [on the subject] (n=1), (c) could be fun (n=1), (d) one-on-one with child (n=1), (e) interest in child (n=1)." The parents of Squaw Peak school's responses included (a) "You use math in everything (n=2), (b) [Family Math] shows application of math concepts (n=3), (c) teaches children to have fun (n=2), and (d) math is an important skill (n=2). The parents of Roselane School said (a) "to show children you need math in everything (n=1), (b) it creates a more equal

communication basis among generations basis among generations (n=1), (c) so my kids can enjoy learning (n=5), (d) so kids can reach their potential(n=1), (e) families working together (n=3), (f) to overcome math phobia (n=1), (g) to apply to everyday activities (n=3), and (h) math is a key skill (n=1). There was a no response rate of 10. The parents of Wilson School's responses included (a) "to obtain a better job after completing school (n=2)," and had a no response rate of two. In conclusion, parent responses revealed their interest in Family Math and/or Family Science.

Proposition 1d: What do you [parents] hope to get from this class?

Commensurate with the previous question's results, virtually all parents responded optimistically about Family Math. Every participating parent from Shaw Butte (n=4 of 4) and Squaw Peak (n=10 of 10) gave responses that indicated their interest in math. The parents from Shaw Butte's responses consisted of (a) "fun, (b) [Family Math] is beneficial to child, (c) helps child, (d) [parent wants] to see what their [children] are doing, (e) helped us [the family], and (f) it's more than numbers." The parents' responses from Squaw Peak School comprised (a) "[to] know what is going on today, (b) new ideas, (c) games to learn, and (d) ideas to help children learn math." The parents of Rose Lane School responses stated (a)"exciting ways to teach math at home (n=5), (b) personally nothing, (c) better interaction with family (n=4), (d) better understanding of math/science concepts (n=1), (e) [my] child enjoys more [Family Math], and (f) desire to learn" (n=3). The parents of Wilson School said, (a) "good grades for children (n=1), and to (b) conduct science experiment" (n=1). There was an error rate (ER) of one. In conclusion, parent responses proved their interest in Family Math/Family Science.

Chart 1



Key=Chart shows affirmative responses from total survey sample.

Results to Proposition 1

In response to proposition 1, the results to the four propositions supported a relationship between parent participants and their value of math. These results demonstrate that the Family Math environment promotes parent participants to further their interest in math. In this CBO environment, parents assuredly would pass this interest on in the form of knowledge to their children. Although parents showed an interest in math, did they similarly value their child(ren)'s learning of this subject? This question became proposition 2.

Proposition 2: Do parents value the child's learning in that subject ?

To test this proposition, the researcher asked parents three questions that assessed whether they wanted their child(ren) to learn math. The results of each question became the supporting subpropositions of 2a, 2b, and 2c.

Proposition 2a: Which part of the class was beneficial to your child ?.

This proposition revealed a relationship between parents and their desire to teach their child(ren) to learn math/science. All the parents (n=4 of 4) from Shaw Butte School responses indicated their interest to teach their children more about math. These favorable responses included (a) "quality time learning to estimate (n=4), (b) applying math to real life (n=1), (c) child participation (n=1), (d) hands-on games (such as estimation) (n=1), and (e) all were good for child (n=1)". In conclusion, parent responses demonstrated their interest to teach their children "to value" math.

Proposition 2b: "Does the Math Program help children do better in school?".

Like the results of the former proposition, this proposition's results indicated most parents' believed the math/science program helps children do better in school. Parents of the schools of Shaw Butte (n=2 of 4), Squaw Peak (n=10 of 10), Rose Lane (n=22 of 24), and Wilson (n=3 of 3) responded affirmatively ("yes") to this question (see Chart 2). In conclusion, most parent responses dislosed an interest to teach their children "to value" math/science. To further understand parent attitudes toward math and their children, the researcher subsequently asked them, "What do you hope your children will get from this class?" This new question became proposition 2c.

Proposition 2c: "What do you hope your children will get from this class?"

Commensurate with the results of the previous proposition, this proposition's results showed all parents hoped their children would benefit from this class. Parents of the schools of Shaw Butte (n=4 of 4), Squaw Peak (n=10 of 10), Roselane (n=21 of 24), and Wilson (n=3 of 3) gave several explanations as to what their children would get from this class. Parents of Shaw Butte believed their children would get, (a) "closeness in their relationship, (b) it's [Family Math] more than numbers [rote learning], (c) it helped us, and (d) to see what they're [children] doing." The parents of Squaw Peak School believed their children would get, (a) "[to understand] math is good to master, (b) an increased [math] ability, (c) a positive idea about math, (d) an appreciation [of math], (e) see that math can be fun, and (f) and a new approach." Parents of Roselane School said their children would get, (a)"family excitement and

Chart 2

Parents' Affirmative Responses to Proposition 2b whi states: Does the Math Program help Children do bette School?

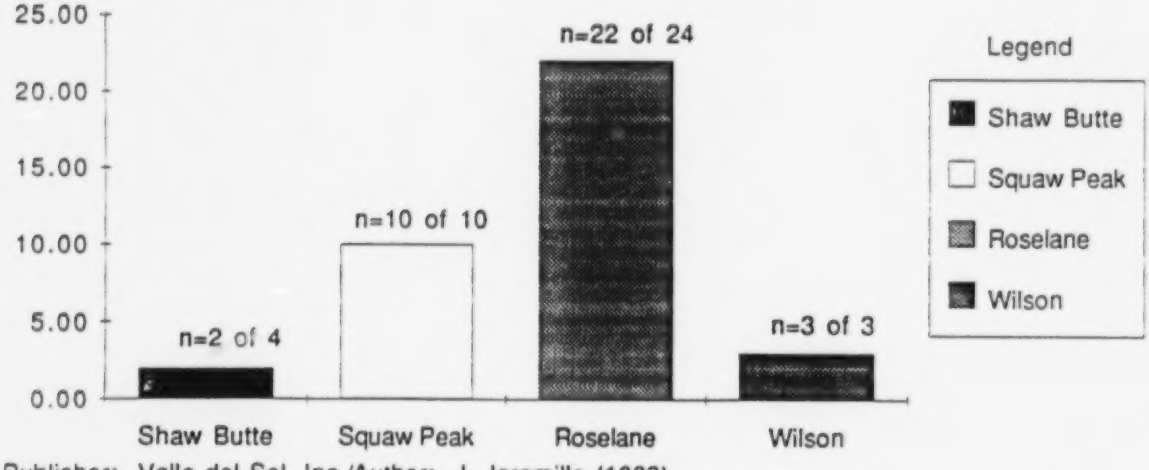


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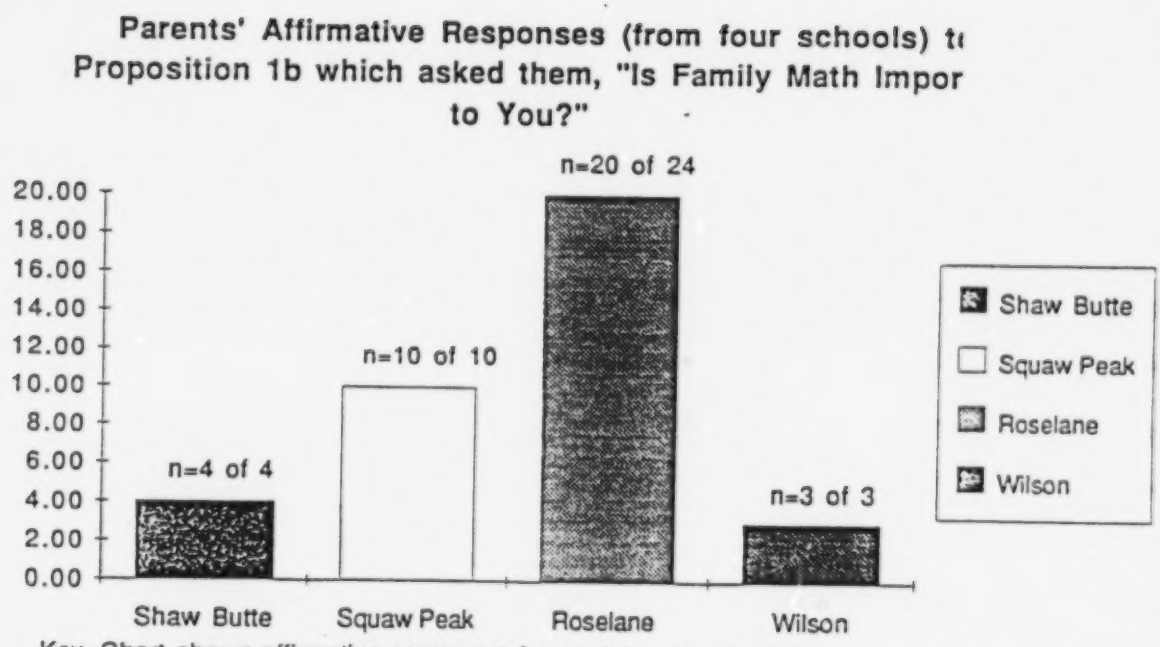
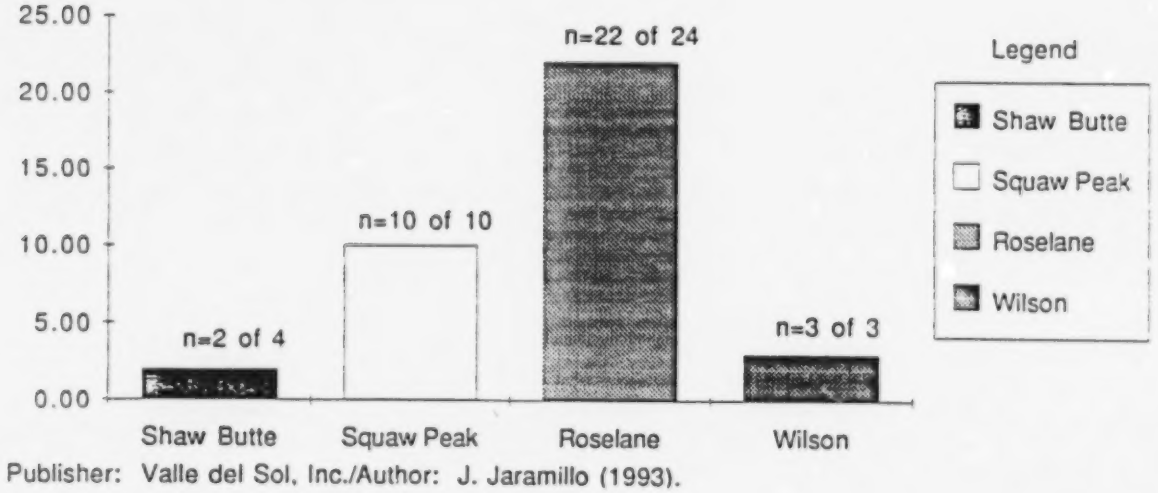
Chart 1



Key=Chart shows affirmative responses from total survey sample.

Chart 2

Parents' Affirmative Responses to Proposition 2b whi states: Does the Math Program help Children do bette School?



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time together (n=6), (b) methods to help children with math (n=2), (c) better understanding of math (n=3), (d) enjoyment of math (n=7), (e) better grades in school (n=1), (f) interest in math (n=3), [to] overcome math phobia (n=1), (h) math's applicability to daily life" (n=10), and had a no response rate of 3. In conclusion, all responding parents expected their children to benefit from the program for academic reasons as well as social ones.

Results to Proposition 2

After testing all three propositions, the results indicated parents highly valued math, and in turn wanted their children to value this subject. Thus, a relationship occurred between parent and student attitudes toward math. This is the learning environment that ERC staff hoped to achieve.

If parents valued their children's learning of math, then would they also believe their child(ren) had the capacity to learn this subject? This question became proposition 3.

Proposition 3: Do parents believe their child(ren) can learn math/science?

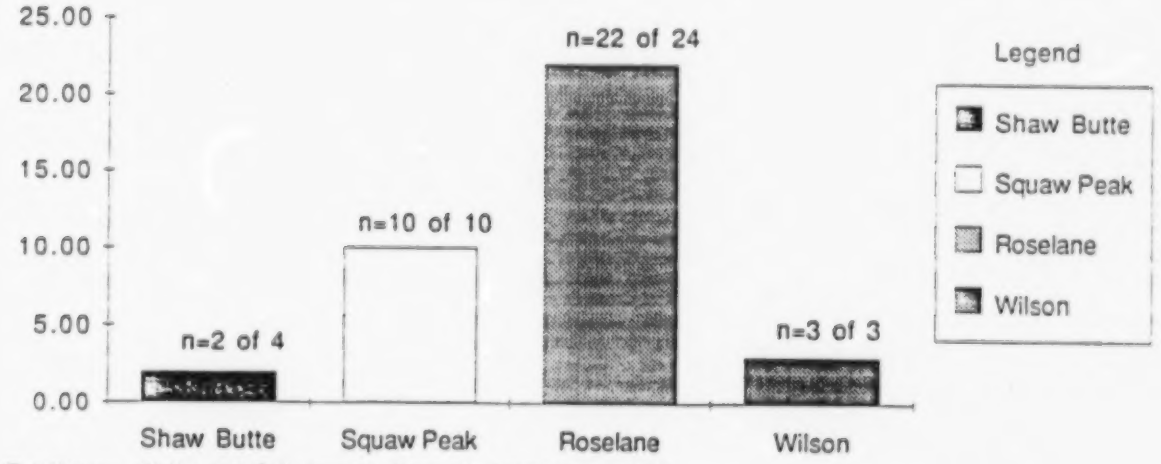
To test this proposition, the researcher asked parents two questions that assessed whether their children had the potential to learn math/science. The results of each question became the supporting propositions of 3a and 3b.

Proposition 3a: How do you think your child(dren) feel about going to Family Math/Family Science?

After testing this proposition, the results indicated a relationship between the parents' attitude and their child(ren)'s attitude toward attending the Family Math/Family Science program. All surveyed parents

Chart 2

Parents' Affirmative Responses to Proposition 2b whi states: Does the Math Program help Children do bette School?



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wrote their children enjoyed attending the program. Based on their responses, the parents of Shaw Butte School (n=4 of 4) thought their children felt this way about attending Family Math and stated: (a) "liked it [the program] a lot, (b) wanted to go, (c) kids [became] disappointed when they missed this class, and (d) excited." The parents of Squaw Peak School (n=10 of 10) responded their children were (a) "eager (n=1), (b) enjoyed (n=4), (c) excited (n=2), (d) enthusiastic (n=1), and (e) child wants to learn new things (n=1)." The parents of Roselane School (n=23 of 24) stated their children thought this way about attending Family Math: (a)"good (n=11), (b) excited (n=5), (c) ok (n=2), (d) disagreeable (n=2), (e) interested" (n=1), and had a no response rate of five. The parents of Wilson School (n=3 of 3) said this about Family Science, (a) "ok (n=1), (b) good" (n=1), and one parent did not respond. In conclusion, virtually all parents and children expressed positive reactions to the programs. Because the parents' children made positive remarks about the programs, what attitudes led them to make these remarks?

Proposition 3b: Why do you think your child/children feel this way?

These results mimicked the former proposition's results. That is, a relationship occurred between the parents' attitude toward the program and their child's. According to their parents, the children expressed positive comments about the program. In regard to their children's feelings toward these programs, the parents of Shaw Butte (n=4 of 4) stated: (a) "like parents and child working together (n=2), (b) likes to explore and learn (n=2), (c) no-pressure environment (n=1), and (d) prizes"(n=1). The parents of Squaw Peak School (n=9 of 10) described the program as (a) "a fun challenge (n=2), (b) a carnival environment

(n=1), (c) free from failure (n=1), (d) child loves to learn new things (n=1), and (e) education is family's priority (n=1)." The parents of Roselane School (n=24 of 24) think their children felt this way, (A)"its an important activity (n=1), (b) curious (n=3), (c) good hands on (n=2), (d) an interactive challenge (n=2), disagreeable (n=4), [children] like all activities" (n=7), and five did not respond while the parents of Wilson (n=3 of 3) said, (a)"she likes numbers," and two did not respond. In conclusion, parents believed their children enjoyed learning math in this program's environment.

Results to Proposition 3: Parents attitude toward their child's math/science potential?

After testing this proposition's subpropositions, the researcher determined that a relationship existed between the parents' attitudes toward their child's ability to learn math and the program's conducive learning environment. While the parents' attitudes toward math/science may motivate their child to learn these subjects, the question is, "Are there interactions and resources in the home 'appropriate for' and 'responsive to' child's interests and skills in the area [of mathematics/science]?" This question became proposition 4.

Proposition 4: Home Environment and Child's Interest in Math/Science.

To test this proposition, the researcher asked parents three questions that assessed whether their children's home environment provided them with the interactions, skills, and interests necessary to excel in math. The results of each question became the supporting propositions of 4a, 4b, and 4c.

Proposition 4a: Do you help your children with their [math/science] homework?

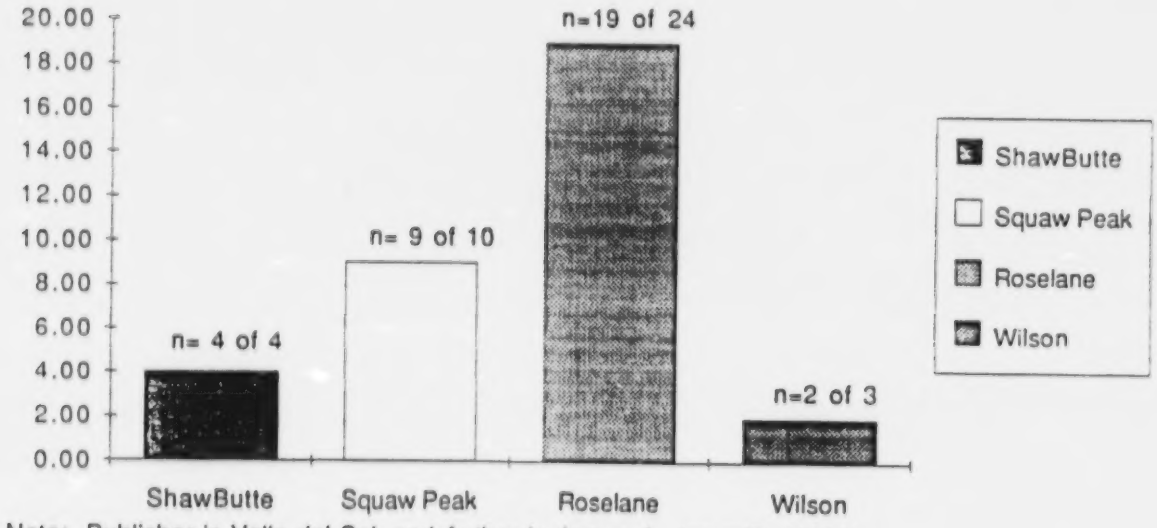
When parents were asked this question, the majority responded affirmatively ("yes"). All the parents of Shaw Butte school (n=4 of 4) responded affirmatively while the majority of parents of Squaw Peak School (n=9 of 10), Roselane School (n=19 of 24), and Wilson School (n=2 of 3) responded affirmatively (See Chart 3). In conclusion, these results indicate parents are interacting with their children during educational activities at the home. If these parents interact with their child(ren) at home, then why did they decide to take Family Math/Family Science? This question became proposition 4b.

Proposition 4b: Why did you [parents] decide to take Family Math/Family Science?

As with the former proposition's results, parent responses to this proposition similarly stressed family interactions. In explaining why they decided to take Family Math, the parents of Shaw Butte School responded because (a) "my child wanted to be involved, (b) learning experience, (c) enjoyed it before, (d) time with kids, and (e) child has trouble with math. The parents of Squaw Peak School stated because (a) "[I] came with [my] granddaughter, (b) kids wanted to come, (c) to avoid TV., (d) important skill in life, and (e) to learn new ways to teach child math." In answering this interrogative, the parents of Roselane School (n=23 of 24) said, (a) "to encourage and help my child's interest in a family setting (n=6), (b) it sounded fun (n=5), (c) received flyer from child's teacher (n=2), (d) child had difficulties with math (n=2), (e) child wanted to come (n=3), (f) math is important (n=2), (g) school provided it (n=2), (h) we like math (n=1) and one parent did not respond. All three parents of Wilson School

Chart 3

Parents' Affirmative Responses (at four schools) to Proposition 4a which states: Do you help your children with their homework?



Note: Publisher is Valle del Sol, and Author is James A. Jaramillo (1993).

did not respond (n=3 of 3). As indicative in most cases, parent responses indicate they wanted to interact with their children. In conclusion, the parents' decision to attend Family Math/Family Science so they could interact with their children matches the program's goal to foster a group learning environment. Lastly, we know that parents were optimistic about attending Family Math/Family Science, but how did their children react? Were they interested? These questions became proposition 4c.

Proposition 4c: How did your children react about attending Family Math/Family Science?

When asked this question, parents indicated their children, like them, were interested in attending Family Math/Family Science. Based on their responses to this question, the parents of Shaw Butte (n=4 of 4) responded my child(ren): (a)"asked me to go, (b) likes to do extra things, (c) excited, and (d) OK". The parents of Squaw Peak School (n=10 of 10) responded my child(ren): (a) "were interested, (b) excited, (c) they wanted to be there with me, (d) enthusiastic, and (e) unsure what to expect." In responding to this interrogative, the parents of Roselane School said, (a) "they [the children] thought it would be fun (n=3), (b) excited (n=5), (c) looked forward to it (n=7), (d) didn't want to go (n=1), and nervous (n=2)." The parents of Wilson School (n=2 of 3) stated: (a) "she started it of herself, (b) bien [good]". One parent did not respond. In conclusion, parents revealed their child(ren)'s desire to attend Family Math/Family Science.

Results to Proposition 4: Home Environment and Child's Interest in Math/Science.

After testing proposition 4, parent responses indicated a positive relationship between the children's home environment and the

interactions, skills, and interests necessary to excel in math. In conclusion, the parents' home environment is compatible with the program's after-school learning environment. The parents from Shaw Butte School and Squaw Peak School overwhelmingly responded favorably that this program's environment motivates students to learn math/science. Nevertheless, the researcher analyzed the parents' perspective about the program, and now the researcher must ask the children's. To assess the students' perspective, it was necessary to focus on their school environment where they pursue their after-school Family Math/Family Science classes.

School Environment.

In following the model of Rosier (1978), the school environment was the second sequential setting to influence a student's academic performance in math/science. This study employed Rosier's (1978:87) definition of the school environment, which states "the professional staff and fellow-students at the secondary school level attended by members of the sample [in 1990]." Staff and student peers composed the general milieu of the school environment. This study examined this environment's effect upon student academic performance. Rosier (1978:89) formulated three basic school environmental variables that this study addressed. These are School Type, Student Body Socioeconomic Level, and Student Body Achievement.

School type includes both the type (government or non-government) and location (metropolitan or non-metropolitan) of a school. This variable defined four categories of schools: government metropolitan, government non-metropolitan, non-government metropolitan and non-government non-metropolitan. As urban public schools, this study

defined all five of these elementary schools as government-metropolitan ones. According to Radford and Wilkes (1975), ". . . students at government schools were more likely to terminate their schooling . . . than were students at non-government schools." With this in mind, students at the government regulated five elementary schools would be expected to terminate their schooling more often than students at non-government schools. This expectation is corroborated by the high dropout rates found in the urban-public schools of Phoenix (see C. Carter 1991; Waits 1990; and Rosier 1978:89).

Rosier (1978) determined that School Type and the mean Student Body Socioeconomic Level of students were related variables that impacted school academic performance. In general, "the higher the average social class of his fellow students, the more a given student will tend to be in contact with other students who as a result of their parental backgrounds plan to attend college; and a given student will tend to adopt such values" (Bain and Anderson 1974:436). These higher income students also tend to attend non-government (private) schools. In regard to one South Central Phoenix Elementary School (which typifies ERC's targeted population), the 1990 U.S. Census data reveals that the grand mean Household Income of these students ($13,809) is classified as impoverished (see Table 3). This household income corresponds to Student Body Socioeconomic Level. Thus, the School Type and Student Body Socioeconomic Level of these students indicates that they are less likely to perform as well as those students who come from higher income families and attend private schools. But, aside from sociological variables, such as income levels and school type which are beyond the control of families, how did the attitudes of students affect their

disposition toward math/science in the school environment? This question became proposition 5.

Proposition 5: Child Attitudes towards the After-School Family Math/Family Science Environment.

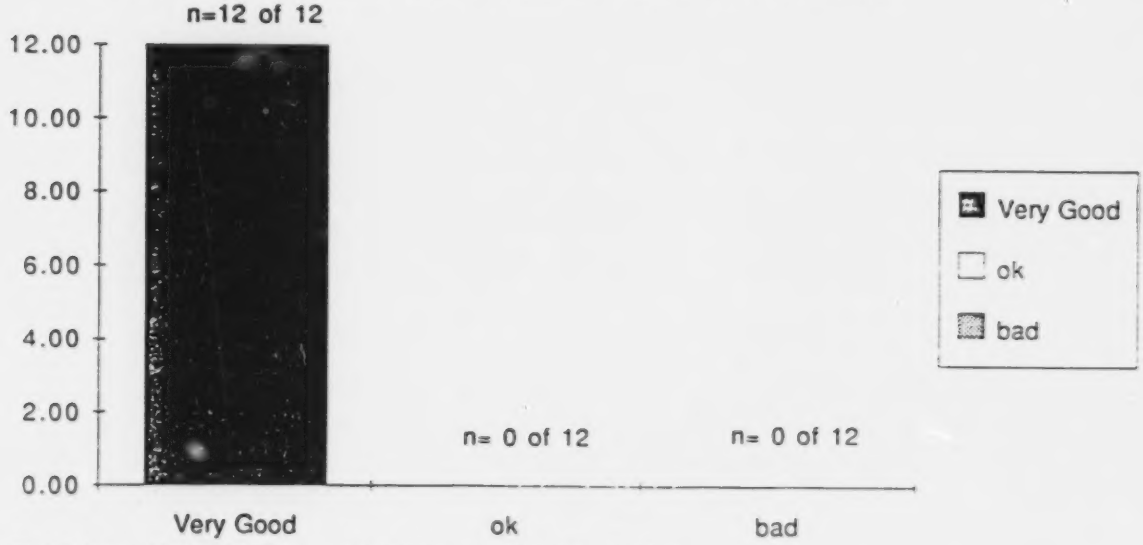
After asking the parents whether they valued Family Math/Family Science and demonstrated an interest in this subject (proposition 1), the researcher asked children if they showed an interest in this subject. This question became proposition 5. This proposition posited was there a relationship between the parents' home learning environment and the child's school learning environment? In other words, was the home learning environment compatible with the Family Math learning environment (De La Cruz 1989). To test this proposition and others, the researcher asked parents questions that assessed whether there was a relationship between these environments. In testing proposition 5, the researcher asked children how they felt about Family Math/Family Science. This became proposition 5a.

Proposition 5a: How do children feel about Family Math/Family Science?

When asked this question, all the surveyed first-grade students of Shaw Butte School disclosed responses which showed their interest in the Family Math program. Given these three answers: very good, o.k., and bad, all the students (n=12 of 12) gave a "very good" reply (see Chart 4). In conclusion, these students, like their parents, displayed a positive "interest" toward Family Math. While students are currently interested in Family Math, would they subsequently show this interest in the future? This interrogative became proposition 5b.

Chart 4

The Affirmative Responses of Children at Shaw Butte School to Proposition 5a, which states: How do you feel about Family Math/Family Science?



Publisher: Valle del Sol, Inc./Author: J. Jaramillo (1993).

Proposition 5b: Do you plan to keep going to this program?

Commensurate with proposition 5a's results, the responses of students from grades one through six overwhelmingly demonstrated their "interest" toward attending future Family Math/Family Science classes. Of those elementary students who planned to keep going to this program, the researcher recorded a majority pupil figure in the proceeding schools: 10 of 12 in grades first through sixth at Squaw Peak School, 8 of 9 first graders at Shaw Butte School, 9 of 17 first graders at Bethune School, 19 of 21 fourth graders at Rio Vista School, 14 of 14 fourth graders at Sullivan Elementary School, 20 of 22 sixth graders at Rio Vista School, 27 of 36 students of various grades at Roselane School, and 16 of 18 students of various grades at Wilson School responded affirmatively. In conclusion, the majority of elementary students demonstrated a long-term interest in these programs.

Results to Proposition 5:

The results indicated that most children exhibited current and future interest in Family Math/Family Science. This interest implies congruency between the children's home learning environment and the after-school learning environment. So the students value or show interest in Family Math/Family Science, but do they think their parents exhibit the same level of interest? This interrogative became Proposition 6.

Proposition 6: Do your parents like these programs?

The majority of children said their parents like the [Family Math/Family Science] programs. Of those elementary students who responded affirmatively that their parents liked the program, the researcher recorded a majority student response rate in the proceeding schools: 10

of 12 in grades first through sixth at Squaw Peak School, 9 of 9 first graders at Shaw Butte School, 11 of 17 first graders at Bethune School, 19 of 21 fourth graders at Rio Vista School, 13 of 14 fourth graders at Sullivan School, 21 of 22 sixth graders at Rio Vista School, 31 of 37 students of various grades at Roselane School, and 15 of 18 students of various grades at Wilson School. In conclusion, the majority of elementary students demonstrated a long-term interest in the program. These results are corroborated by the results of proposition 2 which similarly indicated parent interest toward Family Math/Family Science. But, even with parent interest in the child's learning of math, does enthusiasm in itself generate student academic success. That is, don't children also need interactions and resources in the school and house settings to stimulate their interests and skills in the area? This question became proposition 7.

Proposition 7: School-Family Interactions and Resources.

The formula for student academic excellence comprises interest, interaction, and resources among the family in the household and school settings. To activate this formula, congruency between the learning environments of the home and school must develop. To test this proposition, the researcher analyzed two survey questions which in turn became the propositions 7a and 7b. Proposition 7a asked students if they had the necessary resources to carry out Family Math activities.

Proposition 7a: Did the students have everything they needed?

In response to this question, the majority of students indicated they have everything (resources) they needed to complete their Family Math activities. All of the students at Shaw Butte School (n=12 of 12) responded they had everything (resources) they needed to conduct their

math activities. Although the Family Math program provided students with learning resources, did the household environment likewise provide students with resources? To address this question, the researcher asked students, "Do your parents help you with your homework?" This question became proposition 7b.

Proposition 7b: Do your parents help you with your homework?

When asked this question most children said their parents gave them assistance with their homework. Of those elementary students who planned to keep going to this program, the researcher recorded mostly affirmative responses in the proceeding schools: 8 of 12 students from different grade levels at Squaw Peak school, 8 of 9 first grade students from Shaw Butte, 13 of 17 first grade students from Bethune School, 13 of 21 fourth grade students at Rio Vista School, 9 of 14 fourth grade students at Sullivan School, 12 of 17 sixth grade students at Rio Vista School, 30 of 37 students of various grades at Roselane School, and 10 of 18 students of various grades at Wilson School. In conclusion, most students' parents help their children with their homework.

Results to Proposition 7.

Based on student responses to both of proposition 7's questions, most pupils demonstrate they are obtaining the needed interactions and resources in the environments of the school and home. Thus, congruency occurred between the learning environments of the home and school. While these results show congruency between the school and home, are these settings congruent with the community? To answer this interrogative, the researcher asked teachers, parents, and community liaisons, who attended the program, to evaluate the "Teach the Teacher" training sessions. Adult positive evaluations of the program indicated

their acceptance of the program and their desire to implement after-school classes in their communities.

Community Environment.

The *community setting* (i.e., South Mountain Community College) is where instructors, parents, and community liaisons trained to become certified Family Math/Family Science Instructors. The responses of those adult participants (who attended the teacher training sessions) were used to answer the following primary question categories:

(1) Evaluate the presentation of the program's activities?

(2) What changes would you recommend for future workshops?

The objective was to measure the short-term impact of the Family Math/Family Science training sessions upon those apprentice instructors who participated in one or more of these sessions during the years of 1991, 1992, and 1993. To execute this objective, the researcher conducted a separate short-term impact analysis of each training session because each one took place at a different date and with different participants. The program-instructor trainee population of this study reflected a representative sample because the researcher randomly surveyed them (n=155). To clarify, the researcher conducted a series of mini-studies about each two-day training session to measure the short-term impact of the program upon adult participants. The first training session of study began in November of 1992.

Family Science Evaluation Results of November 6, and 7, 1992

OBJECTIVE:

To measure the short-term impact of the Family Science-Training Program upon apprentice instructors, who evaluated the program during their training sessions on November 6th, and 7th, 1992.

METHOD:

This study employed descriptive-statistical techniques to identify, define, and assess the impact of the Family Science Training Program upon the Fall of 1992 participants. Statistical techniques consisted of descriptive statistics from this populations' survey responses. To assess the impact of the program, the researchers distributed surveys to adult participants (teachers, teacher aides, and parents) in the classroom at the climax of the program. On these surveys, participants answered seven questions that evaluated the Family Science Program's training activities. The total population on the first day included 34 participants, the second day included 34 participants, and both days included 37 participants as a whole. The total sample size (n=26) consisted of those participants who completed their surveys. The researcher obtained a sample size of 24 of 34 on the first day of instruction (11/06/1992) and 24 of 34 on the second day of instruction (11/07/1992).

POPULACE:

This diverse adult population included teachers, teaching aides, and parents. Based on the total population of 37 participants, the hierarchical population breakdown by status comprised certified teachers, classified teachers, and parents. Adult participants consisted of a multi-cultural population comprising Anglos, Hispanics, African Americans, Native Americans, and Other people.

Note: None of these findings may be presented orally or written without citing Valle Del Sol, Inc. as the publisher and James A. Jaramillo as the author (1993).

Family Science Evaluation Results of November 6, and 7, 1992

OUTCOMES:

Using this scale: 3=Poor, 2=Average, and 1=Excellent, the 24 participants surveyed on the first instruction day (2/06/92) gave the program an evaluation score of 1.71 (see Graph 1). This score falls between the average to excellent range. Using this same scale, the 24 participants surveyed on the second instruction day (11/7/92) gave the program an evaluation score of 1.06 (see Graph 1). This score indicated an excellent program performance. The grand mean score of X=1.11 for both days indicated that 26 participants on the average rated the program close to excellent (see Graph 1). In conclusion, the Family Math Training Program proved to be a successful short-term training program.

FUTURE STUDY: The long-term impact of the training sessions upon these apprentice teachers from 1992 to 1993 was assessed in a follow-up study conducted by James A. Jaramillo and Doyala Vaughn (see Family Math & Science Study of 1992.).

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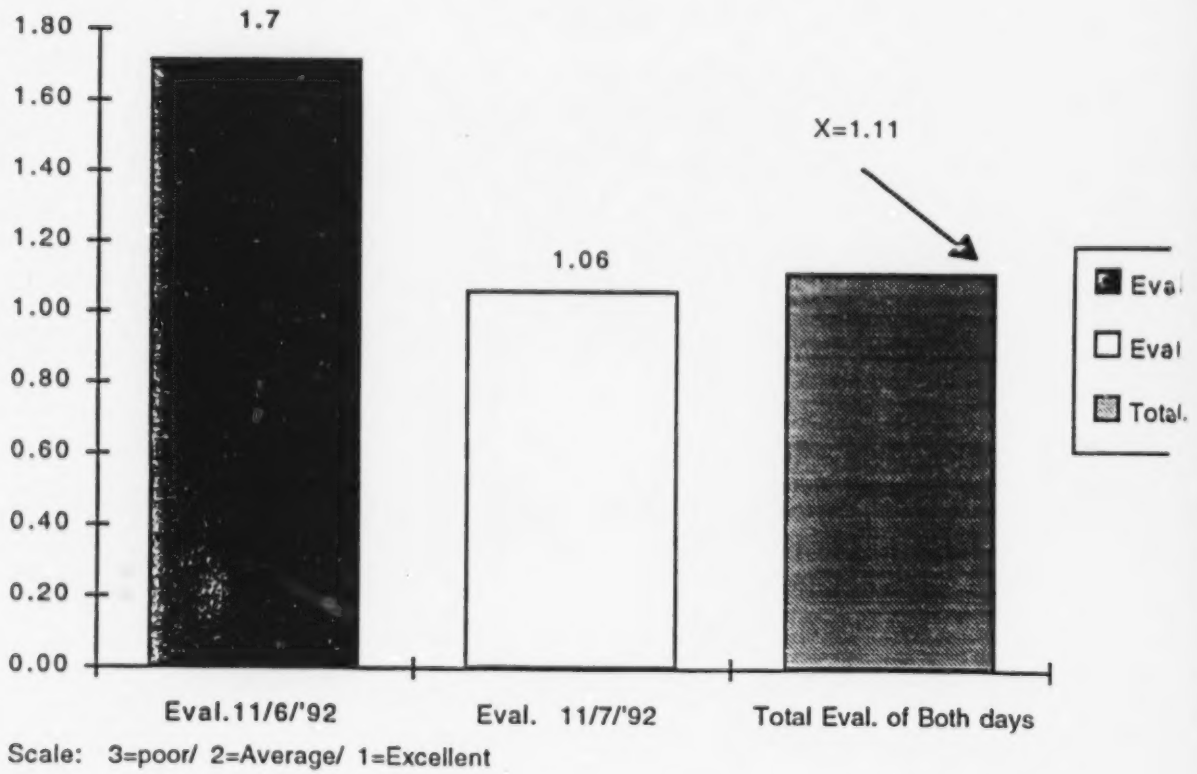
In this follow-up study, the survey results from both Family Math and Family Science participants of 1992 were analyzed by the researcher to assess the impact of these programs upon adults and children.

Graph 1

Average Evaluation Scores of Family Science Program on November 6th, and 7th, of 1992 as Reported by Adult Participants.



Scale: 3=poor/ 2=Average/ 1=Excellent

Publisher: Valle del Sol, Inc.
Author: J. Jaramillo (1993).

Family Math/Family Science Impact Results as reported by Adult Participants of 1992.

PROGRAM: Family Math and Science Programs exists to continue improving the access of math and science education to non-mainstream populations that otherwise may not have this opportunity.

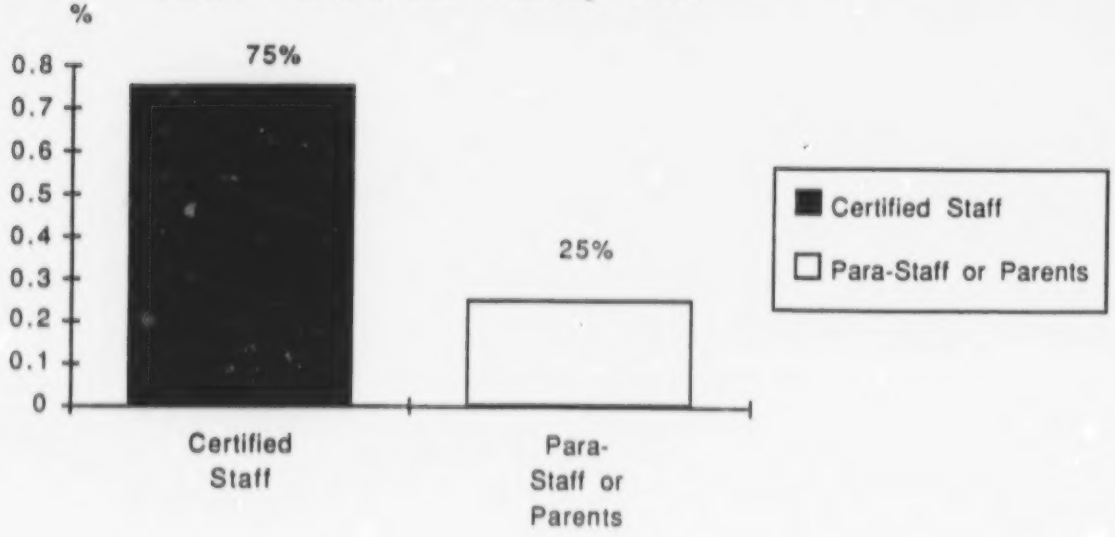
OBJECTIVE: To measure the impact of Family Math/Family Science programs upon the participants of 1992.

METHOD: This study employed descriptive and statistical techniques to identify, define, and assess the impact of the programs upon 1992 participants. Descriptive techniques consisted of participant observations and surveys of staff, parents, and students. Statistical techniques consisted of descriptive statistics from this population's survey responses. The researcher surveyed all of the participants by telephone. Student responses were recorded by teachers in the classroom. The researcher employed a random sample size of 90 adults from a total population of 217 adult participants. The resulting high survey response rate of 66% (60/90) enabled the researcher to derive statistically significant results about adult participants.

POPULACE: This heterogeneous population included teachers, parents, and students. Based on the 60 adult participants surveyed, 75% (45) were certified teachers and 25% (15) were classified staff or parents (Graph 2). Participants comprised a multicultural population consisting of Anglos (51%), Hispanics (27%), African Americans (8%), Native Americans (8%), and other people (5%) (Graph 3).

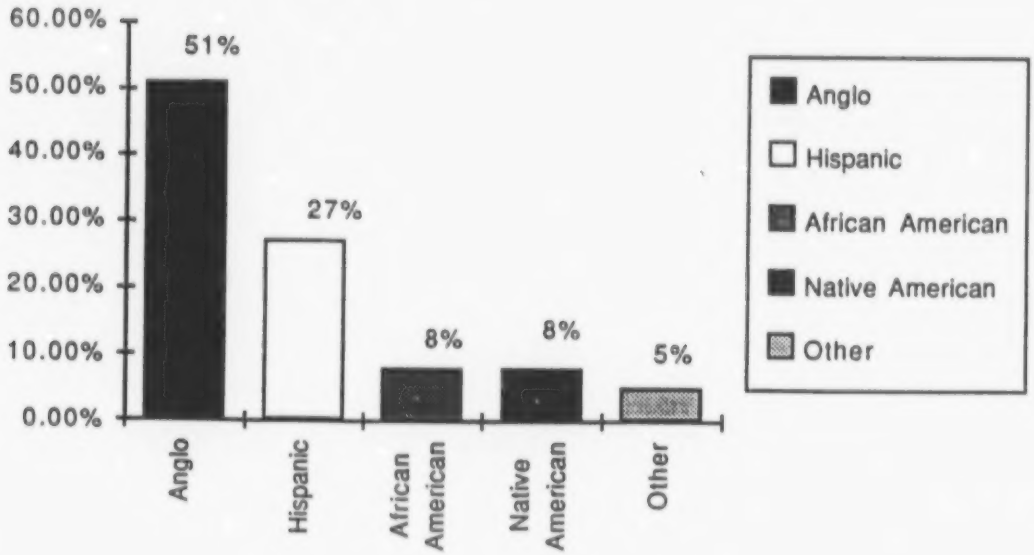
Graph 2

Percentile Breakdown of Family Math and Science Adult Participants During 1992



Graph 3

Percentile Breakdown of Adult Participants Ethnicity



FINDINGS: During the past year of 1992, Family Math and Family Science served 417 participants who were composed of adults and students. Of the adult participants surveyed, 60% (36) reported to have previously conducted Family Math and/or Science Workshops, or to have scheduled to do so in the near future (Graph 4). Of the teachers surveyed, 90% (54) reported implementing program concepts into their curriculum (Graph 5). Among the teachers surveyed, 70% (42) concluded that the same parental involvement was maintained while 30% (18) reported an increase in parental involvement (Graph 6).

The teachers also reported that 54% (108/201) of their students had demonstrated an improved comprehension level about math and science concepts (Graph 7). The ethnic percentile breakdown of students who benefited from Family Math and Science concepts include Hispanics (55%/111), Anglos (28%/56), African Americans (10%/20), Native Americans (6%/12), and Other people (1%/2).

Family Math Evaluation Results of February 1993

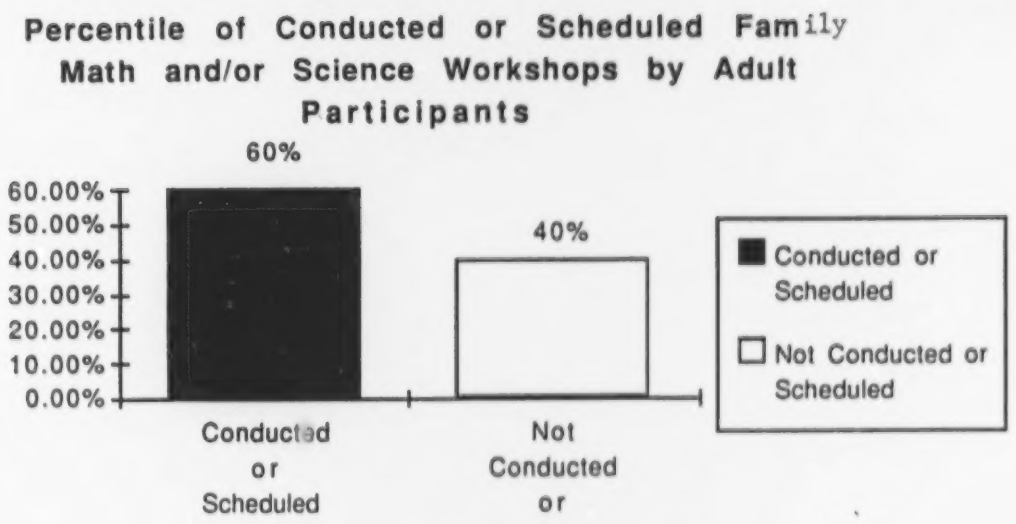
OBJECTIVE:

To measure the short-term impact of the Family Math-Training Program upon apprentice instructors during their training sessions on February 12th and 13th, of 1993.

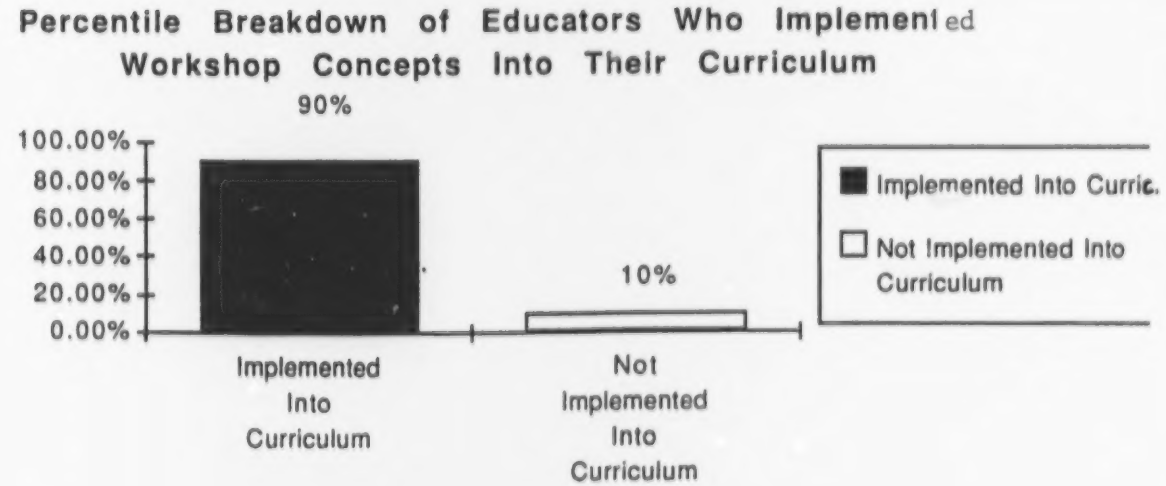
METHOD:

This study employed descriptive-statistical techniques to identify, define, and assess the impact of the Family Math Training Program upon the Spring of 1993 participants. Statistical techniques consisted of descriptive statistics from this populations' survey responses. To assess the impact of the program, the researchers distributed surveys to adult participants (teachers, teacher aides, and parents) in the classroom at the climax of the program. On these surveys, participants answered 10 questions that evaluated the Family Math Program's training activities. The total population on the first day included 21 participants, the second day included 17 participants, and both days

Graph 4

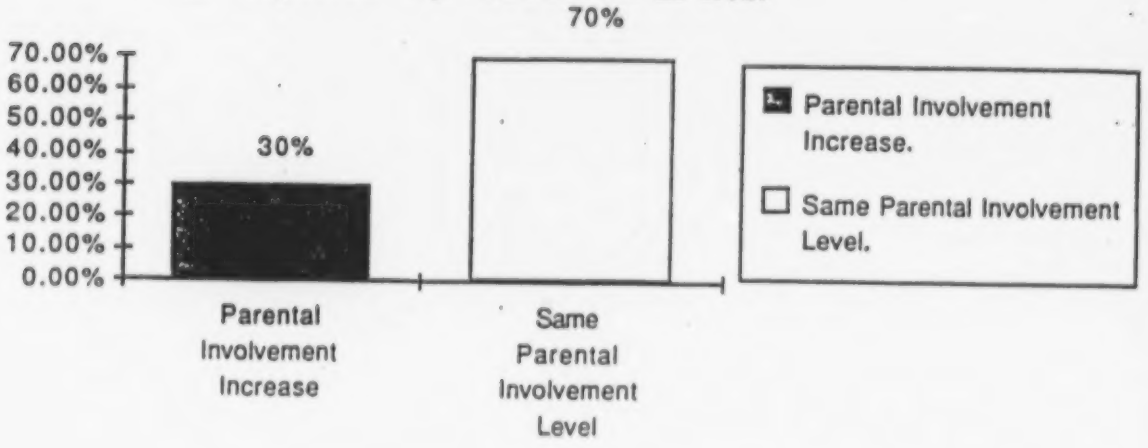


Graph 5



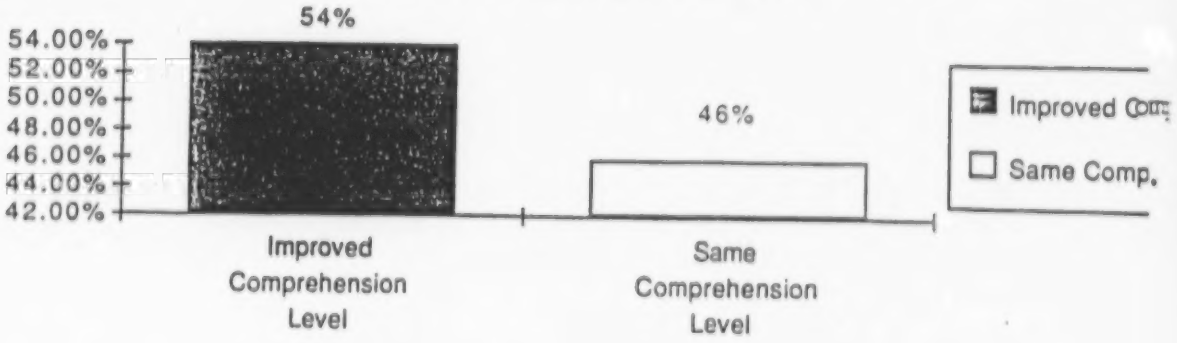
Graph 6

Percentile Level of Parental Involvement as Reported by Educators in 1992.



Graph 7

Student Comprehension Level of Workshop Concepts According to Educators in 1992.



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included 38 participants. The total sample size (n=31) consisted of those participants who completed their surveys. The researcher obtained a sample size of 18 of 21 (85.71%) on the first day of instruction (2/12/1993) and 13 of 17 (76.47%) on the second day of instruction (2/13/1993).

Context of Limitations:

Of the total population, 15 of 21 of those participants who attended the first day of session returned to attend the second day. Thus, the researcher observed duplicate informants when both days were analyzed. Nevertheless, every informant evaluated each program on the day of its corresponding session. Two-day evaluations were not disseminated to these apprentice instructors.

Note: None of these findings may presented orally or written without citing Valle del Sol, Inc. as the publisher and James A. Jaramilo as author.

POPULACE:

This diverse adult population included teachers, teaching aides, and parents. Based on the total population of 38 participants, the hierarchical population-breakdown by status consisted of certified teachers, classified teachers, and parents. Adult participants consisted of a multi-cultural population comprising Anglos, Hispanics, African Americans, Native Americans, and Other people.

OUTCOMES:

Using this scale: 3=Poor, 2=Average, and 1=Excellent, the 18 participants surveyed on the first instruction day (2/12/1993) gave the program an evaluation score of 1.35 (see Graph 8). This score falls between the average to excellent range. Using this same scale, the 13 participants surveyed on the second instruction day (2/12/93) gave the program an evaluation score of 1.03 (see Graph 8). This score corresponds to an excellent program performance. The grand mean score of X=1.26 for both days indicated that 31 participants on the average rated the program between the average to excellent range (see Graph 8). In conclusion, the Family Math Training Program proved to be a successful short-term training program.

FUTURE STUDY:

In order to measure the longer-term impact of the training sessions upon these new teachers, the researcher needs to conduct a future study. The informant baseline of this study could commence on the date of each session (2/12-2/13) and terminate at a future date in order to define the temporal parameters of this longitudinal study.

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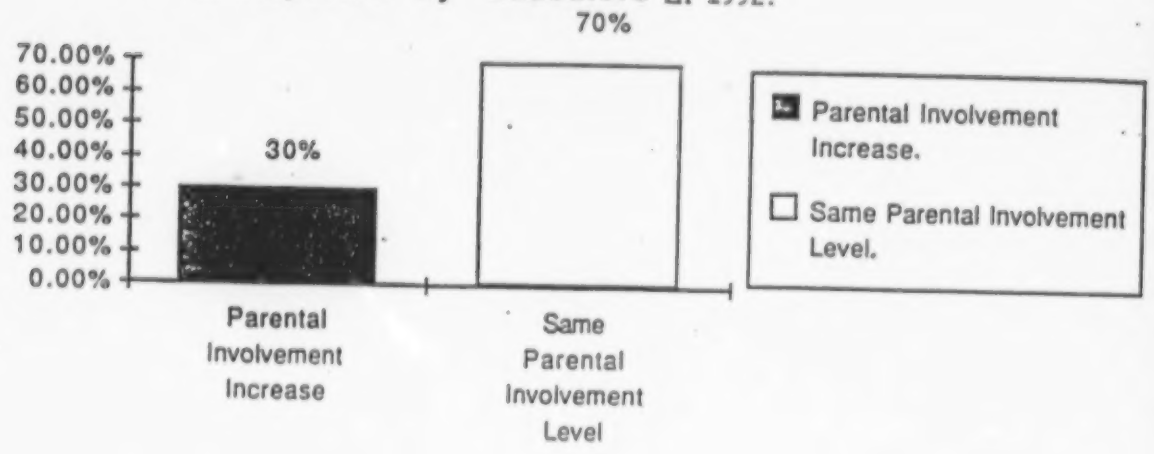
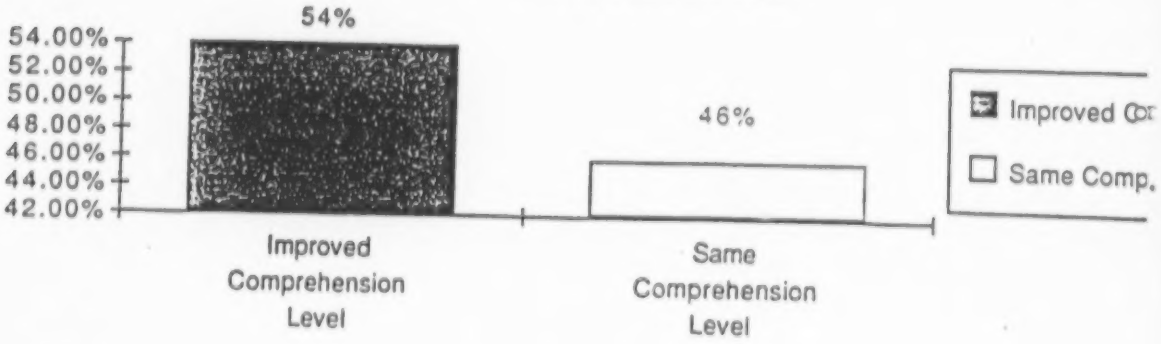
Graph 6

Percentile Level of Parental Involvement as Reported by Educators in 1992.



Graph 7

Student Comprehension Level of Workshop Concepts According to Educators in 1992.



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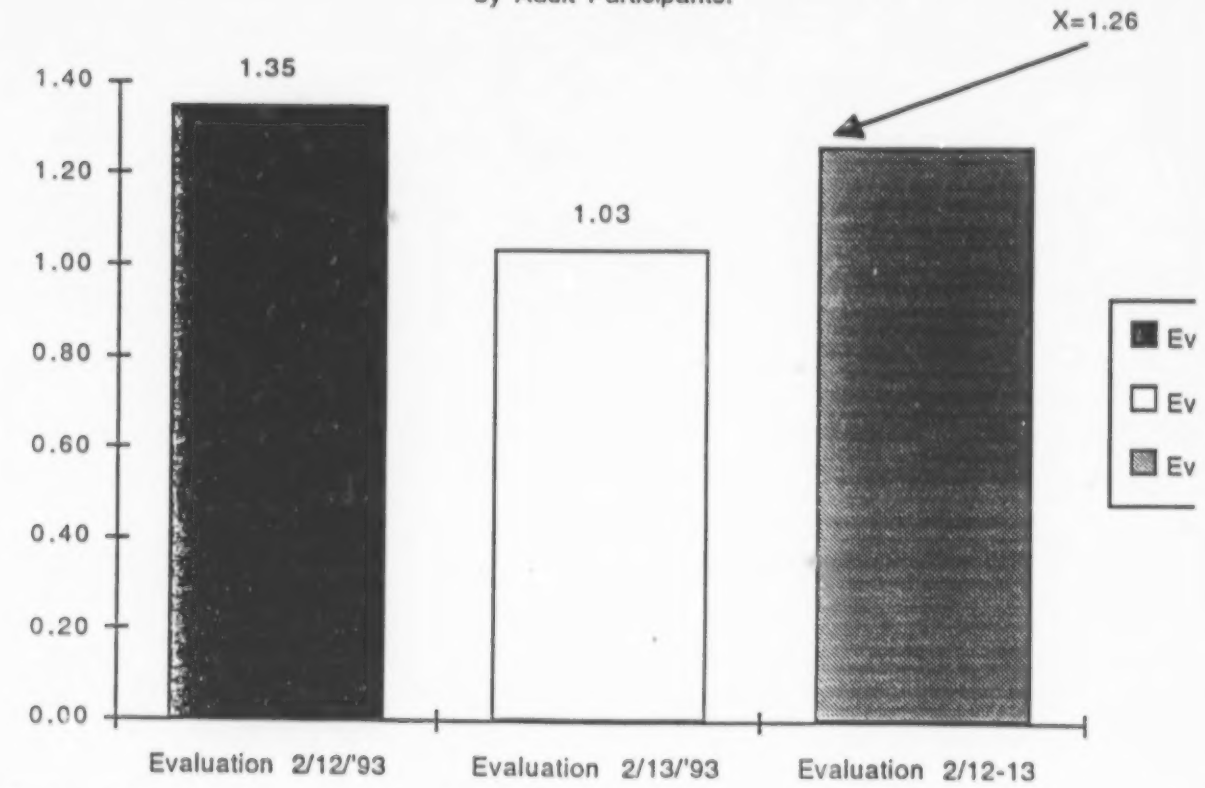
Graph 8

Average Evaluation Scores of Family Math Program on February 12, and 13, 1993 as Reportec by Adult Participants.



Scale: 3=poor/ 2=Average/ 1=Excellent

Family Science Evaluation Results of March 12th, and 13th, 1993

OBJECTIVE:

To measure the short-term impact of the Family Science Training-Program upon apprentice instructors during their training sessions on March 12th and 13th, of 1993.

METHOD:

This study employed descriptive-statistical techniques to identify, define, and assess the impact of the Family Science Training Program upon the Spring of 1993 participants. Statistical techniques consisted of descriptive statistics from this populations' survey responses. To assess the impact of the program, the researcher distributed surveys to adult participants (teachers, teacher aides, and parents) in the classroom at the climax of the program. On these surveys, participants answered questions that evaluated the Family Science Program's training activities. The total population on the first day included 33 participants, the second day included 27 participants, and both days included 52 participants. The total sample size of 49 of 60 (81.66%) consisted of those participants who completed their surveys. The researcher obtained a sample size of 25 of 33 (75.75%) on the first day of instruction (3/12/1993) and 24 of 27 (88.88%) on the second day of instruction (3/13/1993).

Context of Limitations:

Of the total population, 25 of 33 participants who attended the first day of session returned to attend the second day. Thus, the researcher observed duplicate informants when both days were analyzed. Nevertheless, every informant evaluated each program on the day of its corresponding session. Two-day evaluations were not disseminated to these apprentice instructors.

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Family Science Evaluation Results of March 12th, and 13th, 1993

POPULACE:

This diverse adult population included teachers, teaching aides, and parents. Based on the total population of 34 participants, the hierarchical population-breakdown by status consisted of certified teachers and classified teachers (n=28), and parents (n=6). Adult participants consisted of a multi-cultural population comprised of Anglos, Hispanics, African Americans, Native Americans, and people who defined themselves as Other.

OUTCOMES:

Using this scale: 3=Poor, 2=Average, and 1=Excellent, the 18 participants surveyed on the first instruction day (3/12/1993) gave the program an evaluation score of 1.19 (see Graph 9). This score falls between the average to excellent range. Using this same scale, the 13 participants surveyed on the second instruction day (3/13/'93) gave the program an evaluation score of 1.13 (see Graph 9). This score corresponds to an excellent program performance. The grand mean score of X=1.16 for both days indicated that 34 participants on the average rated the program between the average to excellent range (see Graph 9). In conclusion, the Family Science Training Program proved to be a successful short-term training program.

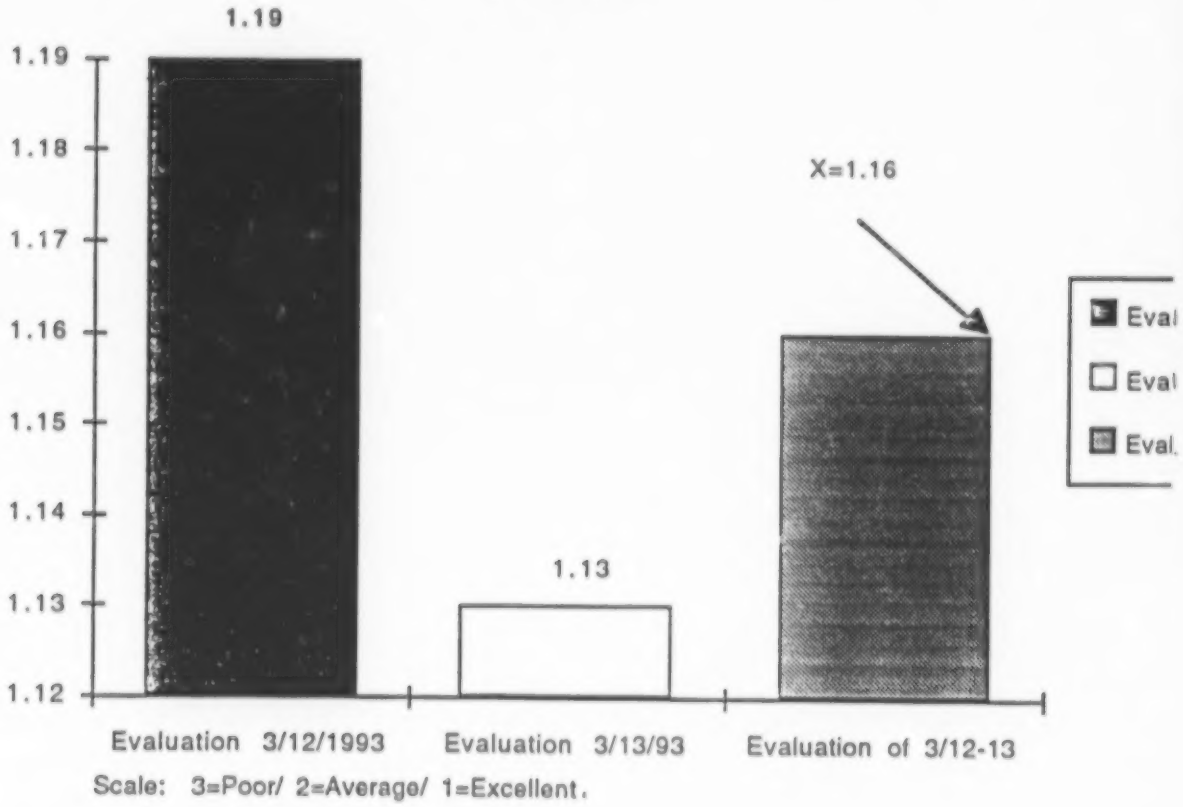
FUTURE STUDY:

In order to measure the longer-term impact of the training sessions upon these new teachers, the researcher needs to conduct a future study. The informant baseline of this study could commence on the date of each session (3/12-3/13/93) and terminate at a future date in order to define the temporal parameters of this longitudinal study.

Note: None of these findings may presented orally or written without citing Valle Del Sol, Inc. as the publisher and James A. Jaramillo as the author.

Graph 9

Average Evaluation Scores of Family Science Program on March 12, and 13, of 1993 as Reported by Participants.



Matematicas Para La Familia Evaluation Results of April 16th, and 17th, 1993.

OBJECTIVE:

To measure the short-term impact of the Bilingual Family Math Training-Program upon apprentice instructors during their sessions on April 16th, and 17th, of 1993.

METHOD:

This study employed descriptive-statistical techniques to identify, define, and assess the impact of the Family Science Training Program upon the Spring of 1993 participants. Statistical techniques consisted of descriptive statistics from this population's survey responses. To assess the impact of the program, the researcher distributed surveys to adult participants (teachers, teacher aides, and parents) in the classroom at the climax of the program. On these surveys, participants answered questions that evaluated the Family Science Program's training activities. The total population on the first day included 18 participants, the second day included 19 participants, and both days included 36 participants. The total sample size of 31 of 37 (83.78%) consisted of those participants who completed their surveys. The researcher obtained a sample size of 14 of 18 (77.77%) on the first day of instruction (4/16/1993) and 17 of 19 (89.47%) on the second day of instruction (4/17/1993).

Context of Limitations:

Of the total population, most participants who attended the first day of session returned to attend the second day. Thus, the researcher observed duplicate informants when both days were analyzed. Nevertheless, every informant evaluated each program on the day of its corresponding session. Two-day evaluations were not disseminated to these apprentice instructors.

Note: None of these findings may presented orally or written without citing Valle del Sol, Inc. as publisher and James A. Jaramillo as author.

Matematicas Para La Familia Evaluation Results of April 16th, and 17th, 1993.

POPULACE:

This diverse adult population included teachers, teaching aides, and parents. Based on the total population of 21 participants, the hierarchical population-breakdown by status consisted of certified teachers and classified teachers (n=18), and parents (n=3). Adult participants consisted of a multi-cultural population comprised of Anglos, Hispanics, African Americans, Native Americans, and people who defined themselves as Other.

OUTCOMES:

Using this scale: 3=Poor, 2=Average, and 1=Excellent, the 14 participants surveyed on the first instruction day (4/16/1993) gave the program an evaluation score of 1.12 (Graph 10). This score falls near the excellent rating. Using this same scale, the 17 participants surveyed on the second instruction day (4/17/93) gave the program an evaluation score of 1.10 (see Graph 10). This score corresponds to an excellent program performance. The grand mean score of X=1.10 for both days indicated that 31 participants on the average gave the program an excellent rating (see Graph 10). In conclusion, the Bilingual Family Mathematics Training Program proved to be a successful short-term training program.

FUTURE STUDY:

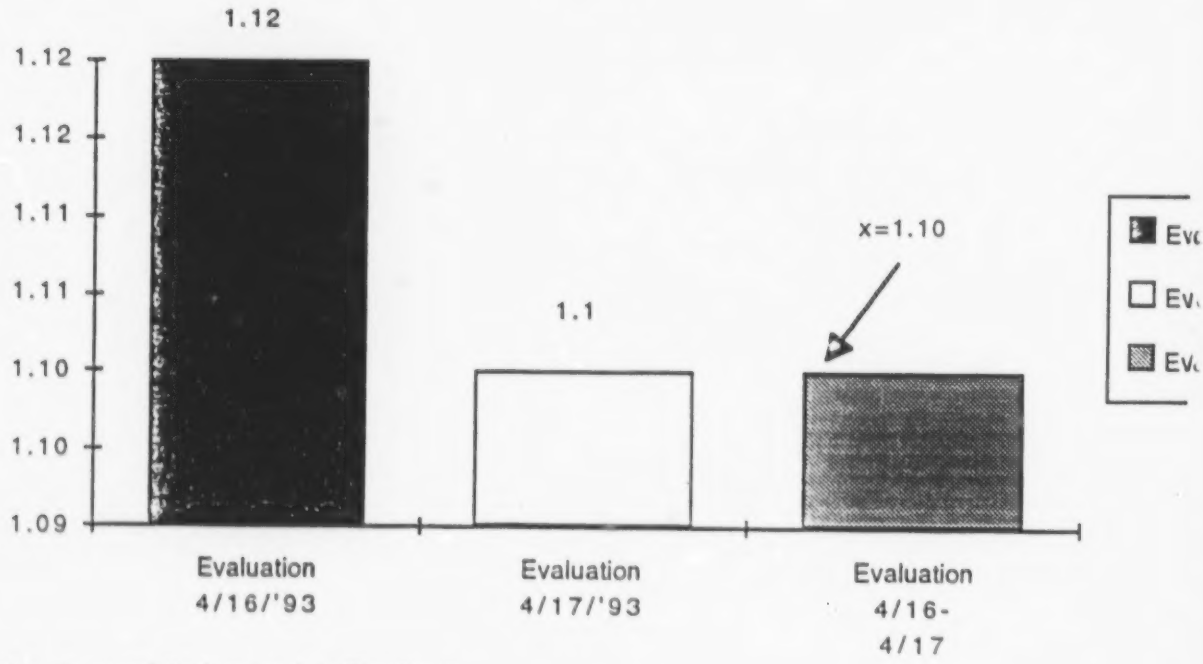
In order to measure the longer-term impact of the training sessions upon these new teachers, the researcher needs to conduct a future study. The informant baseline of this study could commence on the date of each session (4/16-4/17/93) and terminate at a future date in order to define the temporal parameters of this longitudinal study.

A follow-up study of these graduating instructors who begin to to hold after-school classes needs to be assessed to demonstrate if trained instructors are following through with their commitment to hold classes.

Note: None of these findings may presented orally or written without citing Valle Del Sol, Inc. as publisher and James A. Jaramillo as author.

Graph 10

Average Evaluation Scores of Bilingual Mathematics Training Session as reported by Adult Participants on April 16, and 17, 1993.



Scale: 3=poor/ 2=Average/ 1=Excellent.

Results to Adult Participant Evaluations of Family Math/Family Science.

In all four training sessions throughout 1992 and 1993, the surveyed adult participants (n=155) gave the Family Math/Family Science sessions an excellent rating. Thus, the program's learning environment is compatible with adult participants who in turn desire to hold after-school classes in their communities. Most importantly, these results show congruency between the school, home, and the community. These positive adult evaluations of the program indicated their acceptance of the program and their desire to implement after-school classes in their communities. While adult participants gave the programs excellent ratings, how did children rate the programs?

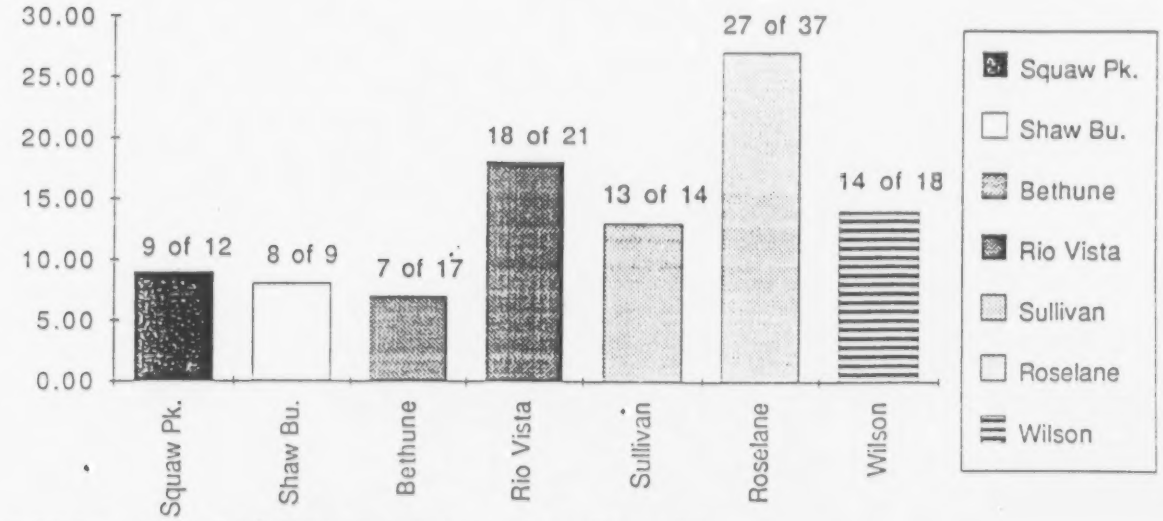
Student Evaluation of Family Math/Family Science Programs.

The majority of students across grades first, fourth, and sixth gave the programs a rating of good or excellent (n=164). The researcher asked students how would you rate these programs? Responses to this question included (a) excellent, (b) good, (c) ok, (D) poor, and (E) bad. When asked this question most children gave the program a good to better rating. Of those elementary students who gave these ratings, the researcher recorded the following responses in the proceeding schools: 9 of 12 students from different grade levels at Squaw Peak School responded good or excellent, 8 of 9 first grade students from Shaw Butte School responded good or excellent, 7 of 17 first grade students from Bethune School responded good or excellent, 18 of 21 fourth grade students at Rio Vista School responded good or excellent, 13 of 14 fourth grade students at Sullivan School responded excellent, 18 of 24 sixth grade students at Rio Vista School responded good or excellent, 27 of 37

students of mixed grade levels at Roselane School responded good or excellent, and 14 of 18 students of Wilson School responded good or excellent (see Graph 11). In conclusion, most students rated the Family Math/Family Science programs as good to excellent.

Graph 11

Students' Good/Excellent Rating of the Family Math/Family Science Programs during the Spring of 1993.



Publisher: Valle del Sol, Inc. & Author: J. Jaramillo (1993).

CONCLUSION

SCHOOL LITERATURE FINDINGS

In summary, there is no one internal or external explanation that adequately explains how minorities perform in school. Among internal explanations, the eugenics' notion that intelligence is determined by racial-genetics was widely discredited among scientists by World War II. The cultural deprivation theory, or culture of poverty notion, may explain why Hispanic and black poverty prevents some minority students from attending college but it fails to account for those external factors that affect these minorities' socioeconomic status. That is, modern American minority subcultures are not closed units; they are affected by economics, politics, and racial discrimination. For example, most of the 20th century Cuban-American immigrant population consisted of educated middle-class and upper-class professionals (Portes and Truelove 1987:326). Thus, unlike the majority of Mexican-Americans and Puerto Rican-Americans, the Cubans came to America with pre-existing class attributes (professional skills and financial assets) that Steinberg (1981) mentions. As political refugees and political allies, the Cuban-Americans received economic assistance while the other Hĭspanic groups went without such aid. This political-economic assistance helped establish the rapid educational success of the Cubans. The neo-internal explanations of cultural discontinuity and ethnomethodology may explain why speech style differences between Anglos and "some" minorities (Hispanics and Native Americans) create learning difficulties, but these theories cannot explain why other non-English speaking minorities, such as the Japanese and Chinese, resolved this language barrier and excelled academically.

The eclectic theories of Ogbu (1978, 1981, 1987) and Foley (1988, 1991) best explain minority school performance. For example, Ogbu provides a plausible caste theory to explain why some minorities (voluntary minorities) usually perform better in school than other minorities (involuntary minorities). These two minority groups developed different internal psyches to cope with the external factors that surround them. The voluntary minorities experienced less racism, and more employment and educational opportunities than their involuntary counterparts. Ogbu employs the internal explanation of relative satisfaction to demonstrate why voluntary minorities develop a positive attitude toward school and thus excel in school. That is, the voluntary minorities reacted positively to their new environment because they believed that it was better than their homeland. Foley's approach is more accommodating than Ogbu's approach. For example, Foley, like Ogbu, is an eclectic, but he argues that class and gender are equivalent to caste (race) in the capitalist racial order. Unlike Ogbu, he reveals that middle-class involuntary minorities (e.g., Mexicanos) use their cultural awareness to succeed in school, politics, and business. Vigil and Long (1981) corroborate this finding in their studies which compared settled Hispanic students to immigrant Hispanic students in two Los Angeles high schools. In other words, assimilation (English Only) is not a prerequisite for educational advancement. In fact, bicultural students often use their cultural heritage to further their academic prowess.

Further eclectic studies of other minority school student groups are needed to test the validity of Foley's (1988, 1991) capitalist-racial order. Although the aforementioned eclectic theories appear promising to explain minority school academic performance, they are long on theory

and short on methodology. To solve this theoretical dilemma, the researcher employed Rosier's (1978) ecological model. After revising Rosier's (1978) model to include CBOs, it proved invaluable as a heuristic tool to demonstrate how student academic performance is influenced by internal blocks (school, personality, and gender) and external blocks (family, sex, economics, and politics) of environmental factors. In this study, students should be perceived as individuals who travel between environmental settings. In affinity with this model's operationality, this study's large sample size of students, parents and/or instructors, and program-trainee instructors enabled the researcher to devise a database baseline for these schools' local cultural settings. This study successfully employed Rosier's (1978) model along with De La Cruz's (1989) home learning environment terminology of elements to test a series of propositions about the relationship between each cohort's attitude and behavior towards school academic performance within the interactive environments of the school, home and community.

MAJOR FINDINGS OF THIS STUDY

School and program documents, and student and faculty surveys yielded productive results about the relationship between each cohort group's attitudes and behaviors toward school academic performance in math/science. This investigation determined a positive relationship existed between each cohort which participated (participants) in the Family Math/Family Science programs and their behaviors and attitudes toward these programs in the environments of the home, school, and community from Fall of 1991 to Spring of 1993 (H1). This study used this hypothesis to supplement and correlate with Rosier's (1978) tested environmental variables. This study deemed the relationship between the

attitudes and behaviors of each cohort group within each environment (participants) as separate sub-hypothesis variables. This study in turn designated each sub-hypothesis as a proposition, and broke down each one into a series of supporting subpropositions. In employing these propositions in conjunction with De La Cruz's (1988) home learning environment "elements," the researcher successfully assessed what participants "think" and "do" in the interactive environments of the home, school, and community. Each proposition then corresponded to an environment. These propositions assessed how cohort perceptions (attitudes) and actions (behaviors) toward CBO participation influences school academic performance. The first three propositions focused on the parents within the interacting environments of the school and home, while the remaining ones focused on the community.

In response to proposition 1, the results to the four subpropositions (1 a, b, c, & d) supported a relationship between parent participants and their value of Family Math/Family Science. These results demonstrated that the Family Math/Family Science environment encourages parent participants to further their interest in these subjects. In this CBO environment, parents assuredly would pass this interest on in the form of knowledge to their children. Nevertheless, although parents showed an interest in math, did they similarly value their child(ren)'s learning of this subject? This question became proposition 2.

After testing proposition 2's three subpropositions, (2 a, b, & c) the results indicated parents highly valued math/science, and in turn wanted their children to value these subjects. Thus, a relationship occurred between parent and student attitudes toward math/science. This is the learning environment that ERC staff hoped to achieve. Nevertheless, if

parents valued their children's learning of math/science, then would they also believe their child(ren) had the capacity to learn these subjects? This question became proposition 3.

After testing this proposition's subpropositions (3 a, b, & c) the researcher determined that a positive relationship existed between the parents attitude toward their child's ability to learn math and the program's conducive learning environment. While the parents' attitudes toward math/science may motivate their child to learn these subjects, the question is, "Are there interactions and resources in the home 'appropriate for' and 'responsive to' child's interests and skills in the area [of mathematics/science]?" This question became proposition 4.

After testing proposition 4, parent responses indicated a positive relationship between the children's home environment and the interactions, skills, and interests necessary to excel in math/science. In conclusion, the parent's home environment is compatible with the program's after-school learning environment. Nevertheless, although the researcher analyzed the parents' perspective about the program, he must now ask the children's (proposition 5). To assess the students' perspective it was necessary to focus on their school environment where they pursue their after-school Family Math/Family Science classes.

The results of proposition 5, indicated that most children exhibited current and future interest in Family Math/Family Science. This interest implies congruency between the children's home learning environment and the after-school learning environment. So the students value or show interest in Family Math/Family Science, but do they think their parents exhibit the same level of interest? This interrogative became proposition 6.

According to proposition 6's results, the majority of children said their parents like the [Family Math/Family Science] programs. Of those elementary students who responded affirmatively that their parents liked the program, the researcher recorded a majority student response rate from all seven schools. In conclusion, the majority of elementary students demonstrated a long-term interest in the program. These results are corroborated by the results of proposition 2 which similarly indicated parent interest toward Family Math/Family Science. But, even with parent interest in the child's learning of math, does enthusiasm in itself generate student academic success. That is, don't children also need interactions and resources in the school and house settings to stimulate their interests and skills in the area? This question became proposition 7.

Based on student responses to both of proposition 7's questions, most pupils demonstrated they are receiving the needed interactions and resources in the environments of the school and home. Thus, congruency occurred between the learning environments of the home and school. While these results show congruency between the school and home, are these learning settings congruent with the community? To answer this interrogative, the researcher asked teachers, parents, and community liaisons, who attended the program, to evaluate the "Teach the Teacher" training sessions. Adult positive evaluations of the program indicated their acceptance of the program and their desire to implement after-school classes in their communities.

In all four training sessions throughout 1992 and 1993, the surveyed adult participants (n=155) gave the Family Math/Family Science sessions an excellent rating. Thus, the program's learning environment is compatible with adult participants who in turn desire to hold after-school

classes in their communities. Most importantly, these results showed congruency between the school and home, and the community. These positive adult evaluations of the program indicated their acceptance of the program and their desire to implement after-school classes in their communities. However, while adult participants gave the programs excellent ratings, how did children rate the programs?

The majority of students across grades first, fourth, sixth, and mixed grades gave the programs a rating of good or excellent (n=164). The researcher asked students, "How would you rate these programs?" Responses to this question included (a) excellent, (b) good, (c) ok, (d) poor, and (E) bad. When asked this question, most children gave the program a good to better rating; and most students rated the Family Math/Family Science programs as good to excellent. Thus, all cohorts gave the programs a positive rating.

RECOMMENDATIONS FOR FUTURE STUDIES

The first component of this study was based on the descriptive data results (informant attitudes toward programs) found in the student, faculty, and staff questionnaire responses while the second component of this study seeks to address the statistical school data results. The questionnaire responses facilitated the development of several new propositions which await testing. These responses will further test the relationship between each cohort and school academic performance. This study now seeks to test a series of new propositions based upon the researcher's retrieval of student data such as ITBS scores, school progress reports, and absenteeism rates.

With regard to student responses, in retrospect a positive relationship between student participation in CBOs and school academic performance did transpire. Furthermore, the previous proposition did assess how student perceptions (attitudes) toward CBO participation influences school academic performance. To test this proposition, the researcher asked participants this question, "While you have been attending these programs, did your school grades improve?" Non-participants were asked this question, "If you attended these programs, do you think your grades would improve?"

The previous proposition did not assess how student attitudes toward CBOs influence school academic performance. To answer this proposition, the researcher will determine if a relationship exists between each cohort's attitude toward CBO participation and school academic performance? To address this proposition, the researcher asked child participants this question, "Do these program(s) help you do better in school? Besides testing if a relationship exists between each cohort's attitude toward CBO participation and school academic performance, this study plans to determine if a relationship exists between each cohort's attitude toward program attendance and school tardiness.

To test this proposition among participants, the researcher asked them this question, "While you have been attending these programs, did you get fewer tardies?" In other words, do children believe program participation is associated with fewer tardies? In lieu of the last proposition, the researcher found it necessary to determine if a relationship exists between participant attendance and school attendance. To test this proposition, the researcher asked participants this question, "How often do you attend each program?" and will compare their responses, such as

14) Come se sienten tus hijo(s) cuando supieron que usted iva a la clase Matematica para la familia?_____.

15) Porque tus hijos reacioanaron cuando supieron que hablaba de matematica?_____.

16) Como se llaman sus hijos?_____.

17) Que son las edades de tus hijos?_____.

18) Que grado esta su hijo(s) attendiendo en la escuela?_____.

19) Usted le ayuda a sus hijos en la tarea?_____.

20) Que materias son mas complicados para tus hijos?_____.

21) Que materias les gustan hacer. cuando no esta en la clase de matematica?_____.

22) Descripcion de lo que hace en la mañana?
Manana_____.
Mediodia_____.
Tarde_____.

23) Usted queire que su hijo(s) graduen de la escuela?
A. Si
B. No

24) Quiere que su hijo(s) graduen de la educación mas alta como colegio o universidad? _____.

25) Habla usted mas de un lenguahe? (A) Si (B) NO

26) Si. habla mas lenguahes que son los que hablan en la casa?
_____.

always, usually, sometimes, rarely, and never, to their school attendance record. Due to time constraints during the Spring of 1993, this study focused on the school setting, rather than on community households.

This study needs to further address the neglected household's influence upon student academic performance. Hence, the researcher is considering studying the family environment on a personal level as part of a future study. In addition to studying the family environment's influence upon school academic performance, this study seeks to investigate if gender influences school performance.

This study neglected to thoroughly assess how gender influence school academic performance. In compliance with this goal, the researcher seeks to test the following propositions: Is there a relationship between gender and attendance in each cohort, and between gender in each cohort and school retention? To test the former proposition, the researcher seeks to answer the following question: Do male participants have a higher CBO attendance rate than females? To test the latter proposition, the researcher seeks to answer the following questions: Do male participants have a higher school attendance rate than male non-participants? Do female participants have a higher school attendance rate than female non-participants?

Of those positive relationships revealed, the researcher seeks to test them for predictive value. In testing for predictiveness, the researcher needs to run the following sequence of tests: standard deviation, correlation, and regression. Thus, the researcher, in following Rosier's study, the researcher seeks to determine if any causal relations between environmental factors and school academic performance occur.

To assist community-based organizations and school personnel in their goal to improve student academic performance, this researcher also plans to devise recommendations from further findings to educate the former groups about those factors that influence school academic performance. Secondly, this study's findings will provide the CBOs' personnel with feedback concerning ways to improve their methods toward promoting student academic excellence. Equally important, this survey's findings suggest ways for CBOs personnel to recruit non-participants and to increase current participant attendance. Lastly, student and faculty survey responses that addressed evaluating the CBOs enabled the researcher to devise helpful future guidelines for CBOs.

REFERENCES CITED

Alba, Richard
1991 The Twilight of Ethnicity among American Catholics of European Ancestry. In Majority and Minority. Norman R. Yetman, 5th ed. Pp. 420-429. Needham Heights: Allyn and Bacon.

American Federation of Teachers
1989 In the Demise of the 1982 Murphy Elementary District Promotion Class: Reflections of Organizational Instability. Ph.D. Dissertation, Arizona State University, Tempe.

Arizona Public School Register
1992 Murphy Elementary School Public School Register. Phoenix, Arizona.

Associated Press
1990 Black, Hispanic College Figures Dip: Enrollment, Graduation Trends Worry Education Groups. Kansas City Times Jan. 15,1990.

Bain, R. K. and J. G. Anderson
1974 School Context and Peer Influences on Educational Plans of Adolescents. Review of Educational Research, 44, 4, 429-445.

Banks, J. A.
1982 Educating Minority Youths: An Inventory of Current Theory. Education and Urban Society 15:88-103.

Carter, Craig Alan
1990 The Demise of the 1982 Murphy Elementary District Promotion Class: Reflections of Organizational Instability. Ph.D. Dissertation, Arizona State University, Tempe.

Carter, Deborah J.
1990 Racial and Ethnic Trends In College Participation: 1976 to 1988. Research Briefs. 1(3):1-6.

Cazden, C. V. John, and D. Hymes
1972 Functions of Language in the Classroom. New York: Teachers College Press.

Cox, Oliver Cromwell
1948 Caste, Class and Race: A Study in Social Dynamics. New York: E.P. Dutton.

CU-Boulder Office of Research and Testing
1987 Minority Graduation and Persistence. Boulder: University of Colorado.

De La Cruz
1989 Family Research. Berkeley. University of California, Berkeley.

ERC (Education Resources Center)
1992a An Overview of Valle del Sol. Phoenix, Arizona. Valle del Sol Inc.

ERC (Education Resources Center)
1992b A Family Math/Family Science Program Proposal. Phoenix, Arizona. Valle del Sol, Inc.

ERC (Education Resources Center)
1993 Valle del Sol, Inc. Fact Sheet. Phoenix, Arizona. Valle del Sol, Inc.

Foley, Douglas E.
1988 From Peones to Politicos: Class and Ethnicity in a South Texas Town, 1900-1987. 2nd edition. Austin: University of Texas Press.

Foley, Douglas E.
1991 Explanations of Ethnic School Failure. Anthropology and Education Quarterly 22(1):60-86.

Garbarino, Merwyn
1977 Socio-Cultural Theory in Anthropology. Prospect Heights, Illinois: Holt, Rinehart, and Winston.

Gibson, Margaret A.
1988 Accommodating without Assimilation: Punjabi Sikh Immigrants in an American High School and Community. Ithaca: Cornell University Press.

Hershberg, Theodore et al.,
1991 A Tale of Three Cities: Blacks, Immigrants, and Opportunity in Philadelphia: 1850-1880, 1930, and 1970. In Majority and Minority. Norman R. Yetman, 5th ed. Pp. 185-208. Needham Heights: Allyn and Bacon.

Iowa Tests of Basic Skills (ITBS)
1992 Appendix to the Statewide Report for Arizona Pupil Achievement Testing. Phoenix: Arizona Department of Education.

Jaramillo, James A.
1992 Participants versus Non-Participants in a South Central Phoenix Elementary School. Tempe: Chicano Archives of Arizona State University.

Kraemer, Sandy F. and Rachel Noel B.
1984 Regents Ad Hoc Committee to Investigate and Recommend Ways to improve Minority Student Enrollment and Retention. Boulder: University of Colorado.

Macleod, J.
1987 Ain't No Makin' It: Leveled Aspirations in a Low-Income Neighborhood. Boulder: Westview Press.

Mercer, Joyce
1991 Marginal Improvement in Black, Hispanic College Enrollment in Late 1980s, ACE Study Concludes. Black Issues in Higher Education? 7(24):3-4.

Model, Suzanne
1991 The Economic Progress of European and East Asian Americans. In Majority and Minority. Norman R. Yetman, 5th ed. Pp. 286-294. Needham Heights: Allyn and Bacon.

Moynihan, Daniel Patrick
1965 Employment, Income and the Ordeal of the Negro Family. In The Negro American. Talcott Parsons and Kenneth B. Clark, eds. Boston: Houghton Mifflin.

Nanda, Serena
1991 Cultural Anthropology. 4th edition. Belmont, California. Wadsworth Publishing Company.

Ogbu John
1974 The Next Generation: An Ethnography of Education in an Urban Neighborhood. New York: Academic Press.
1978 Minority Education and Caste: The American System in Cross-Cultural Perspective. New York: Academic Press.
1981 School Ethnography: A Multilevel Approach. Anthropology and Education Quarterly 12:3-20.
1987 Variability in Minority School Performance: A Problem in Search of an Explanation. Anthropology and Education Quarterly 18:312-334.

Olson, Rochelle
1991 "Minority enrollment rises" in University Kansan, Monday, October 7, 101(31):1.

Philips, Susan
1983 The Invisible Culture: Communication in Classroom and Community on the Warm Springs Indian Reservation. New York: Longmans.

Portes, Alejandro and Cynthia G. Truelove
1991 Making Sense of Diversity: Recent Research on Hispanic Minorities in the United States. In Majority and Minority. Norman R. Yetman, 5th ed. Pp. 402-419. Needham Heights: Allyn and Bacon.

Radford, W.C. and R. E. Wilkes
1975 School Leavers in Australia 1971-1972. Hawthorn: Australian Council for Educational Research.

Robinson, C.
1982 Black Marxism: The Making of the Black Radical Tradition. London: Zed Books.

Rosier, Malcolm J.
1978 Early School Leavers in Australia. Hawthorn: Australian Council for Educational Research.

Ruggles, Rick
1991 Graduation Rates for Minorities Concern Midlands College Officials. Sunday World-Herald April 28, 6b.

Schultz, Ray
1993 Few Arizona Pupils Proficient in Math Skills, Report Shows. Arizona Republic/Phoenix Gazette. April 9, 1993 (B1).

Spradley, James P.
1980 Participant Observation. New York: Holt, Rinehart, and Winston.

Steinberg, Stephen
1981 The Ethnic Myth: Race, Ethnicity, and Class in America. New York: Atheneum.

Tamis, Valerie
1991 Revisions in the SAT: Help or Hindrance for Hispanics? The Hispanic Outlook in Higher Education 1(6):5-8.

Trueba, H. T.
1988 Culturally Based Explanations of Minority Students' Academic Achievement. Anthropology and Education Quarterly 14(4).

United States Census Bureau
1990 Census of Population and Housing. Phoenix: Arizona Department of Economic Security.

Van Willigen, John
1986 Applied Anthropology: An Introduction. South Hadley, Massachusetts. Bergin and Garvey Publishers, Inc.

Vega, Santos
1992 A Summative Evaluation of the Phoenix Coalition for Youth and Families. A Final Report. Tempe, Hispanic Research Center of Arizona State University.

Vigil, James Diego and John M. Long
1981 Unidirectional or Nativistic Acculturation-Chicano Paths to School Achievement. Human Organization 40:273-277.

Waits, Juanita O'Campo
1990 Phoenix Coalition for Youth and Families Project. Tucson: University of Arizona.

Weinberg, Meyer
1983 Race and Intelligence in America. In Search for Quality Integrated Education. pp. 55-98.

Wilcox, Kathleen
1982 Introduction. In Ethnography of Schooling: Educational Anthropology in Action. George Spindler, Pp. 457-478. New York: Holt, Rinehart, and Winston.

Yetman, Norman R.
1991 Majority and Minority 5th ed. Needham Heights: Allyn and Bacon.

Zinn, Maxine Baca
1989 Family, Race, and Poverty in the Eighties. In Norman R. Yetman, Majority and Minority 5th ed. Pp.512-522. Needham Heights: Allyn and Bacon.

NOTES

[1] Selma C. Berrol, "Education and Economic Mobility: The Jewish Experience in New York City, 1880-1920," *American Jewish Historical Quarterly*, March 1976, pp. 257-71.

[2] Gutman's unpublished data are summarized by Irving Howe in *World of Our Fathers*, op. cit., pp. 141-44.

[3] Martha S. Hill and Michael Ponza, "Trends in the Economic Situation of U.S. Families and Children, 1970-1980," in *American Families and the Economy*, ed. Richard R. Nelson and Felicity Skidmore (Washington D.C.: National Academy Press, 1983), 9-53, esp. 38.

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B2. Family Child Survey.

C. Family Math Evaluation.

D. Family Science Evaluation.

Code Number:_____

Matématica Para La Familia Cuestinario Para El Pariente

Direcciónes:

Cada cuestión en este cuestinario tiene tipos de las respuestas: si/no; verdad/no verdad; complete cada linea, y letras (A-E). Respueste todas las preguntas. Sí, no sabe como responder circule la letra otro. Toda la información es confidencial.

1)Nombre_____ Apellido_____

2)Que edad tienes?

[ ] 20-25 [ ] 25-30 [ ] 30-35 [ ] 35-40 [ ] 40-45 ____Otro

Etnicidad? [ ] origen de Hispano [ ] Africano-Americano, no Hispano. [ ] origen de Asian. [ ] Nativo Americano.

Sexo? [ ] femenino [ ] masculino [ ] otro.

Profesión del trabajo_____otro_____

(3)Es la primer vez que has tomado matématicas para la familia?

A.Si

B.No

(4) Has atendido un program de estos?

A. Si

B. No

Matématica Para La Familia.

Sciencia Para La Familia.

(5) Sí, dijo que si, circule cada programa?

(6) Te diviertes el programa de matemáticas?

A. Si

B. No

(7) Porque tomas matématica para la familia?

(8) Usted crea que la matématica le ayuda mejor en la escuela?

A. Si

B. No

(9) Si Matématica para la Familia es importante para usted, porque es importante para usted?

A. Muy Advansado

B. Avansado

C. Mas o Menos

D. Menos

E. Otro_____.

10) Que le gustaría recibir de esta clase?

_____

(11) Que le gustaría que su hijo/hija recibá de esta clase?

_____.

12) Como piensa que sus hijos sientán a ir a la clase de matématica?

_____.

13) Porque piensas que tus hijo(s) sientán de este modo?

Appendix A2:

Family Math Parent Survey

Directions: Each of the questions or unfinished statements in this survey are followed by the types of answers: yes/no; true/false; fill in the blanks, and letters (A-E). You have to decide which one answer you think best and then write in or circle your response to each question. Answer all questions. If you don't know how to respond to a question, then circle the "other" response and fill in the blank.

Full Name_____, Code Number:_____

Age Range? [ ] 20-25 [ ] 25-30 [ ] 30-35 [ ] 35-40 [ ] 40-45 [ ] 45-50 [ ] other_____.

Ethnic background? [ ] of Hispanic origins [ ] African-American, not Hispanic [ ] of Asian origins [ ] Anglo [ ] Native American [ ] Other_____.

Gender? [ ] Male [ ] Female [ ] Other_____.

Profession/job position? _____.

Is this the first time you've taken Family Math? A. Yes B. No

If this is not the first time you've taken Family Math, then when, where, and with whom have you taken it with?

_____

_____

Why did you decide to take Family Math?

_____

_____

Do you think the Math Program helps children do better in school?

A. Yes

B. No

Is Family Math important to you?

A. Yes.

B. No.

If Family Math is important to you, why is it important to you?

_____

How do you rate your current math skill-level?

A. Far Above Average

B. Above Average.

C. Average.

D. Below Average.

E. _____.

What do you hope to get from this class?

_____

What do you hope your children will get from this class?

_____

How do you think your child/children feel about going to Family Math?

_____

Why do you think your child/children feel this way?

_____

How did your child/children react when you first talked about attending Family Math with them?

_____

Why did your child/children react this way when you talked about math with them?

_____

What are your child/children's names?

_____

What are your child/children's ages?

_____

What grade level is your child/children attending?

_____

Do you regularly help your children with their homework?
A. Yes.
B. No.

What school subject(s) are hardest for your child?

_____

What kinds of activities do you like to do, when when you're not in Family Math class?

_____

Describe your typical weekday by completing the following time blocks?
Morning-_____
Noon-_____
Afternoon_____Evening-_____

Do you want your child/children to graduate from high school?
A. Yes
B. No

Do you want your child/children to graduate from higher education, such as vocational college or a university?
A. Yes
B. No

Do you speak more than one language to your children? [ ] Yes [ ] No.

If so, which languages do you speak at home?_____

Please give your phone # for future study

Phone # ____ _____

Code Number:_____

Matematica Para La Familia Cuestinario Para El Niño

Direcciones:
Cada cuestion en este cuestinario tiene tipos de las respuestas: si/no; verdad/no verdad; complete cada linea, y letras (A-E). Respueste todas las preguntas. Si no sabe como responder circule la letra otro.

1)Nombre_____ Apellido_____

2)Que edad tienes?
A.9
B.10
C.11
D.12
E.Otro_____.

Etnicidad? [ ] origen de Hispano [ ] Africano-Americano, no Hispano, [ ] origen de Asian, [ ] Nativo Americano.

Sexo? [ ] femenino [ ] masculino [ ] otro.

Que grado estas?_____

(3)Es la primer vez que has tomado matematicas familia?
A.Si
B.No

(4) Has atendido un program de estos?
A. Si
B. No

Matematica Para La Familia.
Sciencia Para La Familia.

(5) Si dijo que si, circule cada programa?

(6) Te divierte el programa de matematica?
A. Si
B. No

(7) Cual actividad del programa te gusto mas?
A. Objectos de medidas
B. Rompecabezas de palabras.
C. Rompecabezas de palillos.
D. Sumar cosas o´numeros.
E. Menos cosas o´numeros.
F. Dibuje cosas o´ desenos.
G. Otro_____.

(8) Que actividades te gustan mas, y porque?
_____.

(9) Que actividades te gustan menos?
_____.

(10) Que ensenan los adultos en cada programa?
A. Como placticar con otra gente.
B. Como oir a otros.
C. Como trabajar con otros.
D. Como estudiar la tarea.
E. Otro_____.

(11) Vaz mucho a los programas?
A. Siempre.
B. Casi todo el tiempo.
C. Ay veces.
D. Casino.
E. Nunca.

(12) Planea ir al programa?
A. Si.
B. No.
(13) Si vaz al programa, crees que vaz atener mejores grados?
A. Si.
B. No.
(14) Cuando vayas a los programas y vaz atener menos?
A. Si.
B. No.
(15) Cuando vayas a este programa, vas a ir a la escuela?
A. Si.
B. No.
(16) Crees que estos programas de van ayudar en la escuela?
A. Si.
B. No.
(17) Te ayudan tus padres con la tarea?
A. Si.
B. No.
(18) Les gusta estos programas a tus padres?
A. Si.
B. No.
(19) Como les gustan estos programas?
A. Excelente.
B. Bueno.
C. Asi Asi.
D. Pobre.
E. Malo.
(20) Hablas mas de mas lenguages en la casa?
A. Si.
B. No.
(21) Si hablas mas de un idioma en casa, cual es?
A. Ingles.
B. Espanol.
C. Yaqui.
*D. Otro*_____.
(22) Quieres ayudar de una escuela preparatoria (high school)?
A. Si.
B. No.
(23) Quieres ayudar de una universidad?
A. Si.
B. No.
(24) Que clase de trabajo te gustaria tener cuando seas grande?

_____

Directions:
Each of the questions or unfinished statements in this survey are followed by the types of answers: yes/no; true/false; fill in the blanks, and letters (A-E). You have to decide which one answer you think best and then write in or circle your response to each question. Answer all questions. If you don't know how to respond to an answer circle the letter other and fill in the blank.

(1) First Name _____ Last Name _____

(2.) How old are you?

A. 7
B. 8
C. 9
D. 10
E. Other_____.

Ethnic background? [ ] of Hispanic origins [ ] African-American, not Hispanic [ ] of Asian origins [ ] Anglo [ ] Native American [ ] Other_____.

Gender? [ ] Boy [ ] Girl [ ] Other.

What grade level are you in? _____.

(3) Is this the first time you've taken Family Math?

A. Yes.
B. No.

(4.) Have you attended any of the programs listed below?

A. Yes
B. No

A. Family Math
B. Family Science.

(5) If you said yes, circle each program (listed above) that you went to?

(6.) Do you enjoy the Family Math program?

A. Yes.
B. No.

(7.) Which program activity below did you like the most?

A. Measuring objects.
C. Word puzzles.
D. Tooth pick puzzles.
E. Adding things or numbers.
F. Subtracting things or numbers.
G. Drawing things or shapes.
H. Other _____.

(8.) Which activities did you like the most, and why?

_____.

(10.) What do adults teach you at each program?
A. How to talk to other people.
B. How to listen to others.
C. How to work with others.
D. How to study or do homework.
E. Other_____

(11.) How often do you goto this program?
A. Always
B. Usually
C. Sometimes
D. Rarely
E. Never.

(12.) Do you plan to keep going to this program?
A. Yes
B. No.

(13.) If you goto these programs, will your school grades get better?
A. Yes.
B. No.

(14.) When you goto these programs, will you get fewer tardies?
A. Yes.
B. No.

(15.) When you goto this program, did you attend school?
A. Yes.
B. No.

(16.) Do you these program help you do better in school?
A. Yes.
B. No.

(17.) Do your parents help you with your homework?
A. Yes.
B. No.

(18) Do your parents like these programs?
A. Yes.
B. No.

(19) How would you rate this programs?
A. Excellent.
B. Good.
C. OK.
D. Poor.
E. Bad.

Education Resources Center

F A M I L Y M A T H

E V A L U A T I O N

FRIDAY, FEBRUARY 12, 1993

Please evaluate the presentation of each of the following activities by circling the appropriate number: 3 means poor; 1 means excellent.

Activity	Excellent	Average	Poor
Double Digit	1	2	3
Reverse Double Digit	1	2	3
Trash Can Math	1	2	3
Value of Words	1	2	3
Target Addition	1	2	3
Math around the world	1	2	3
Balloon Ride	1	2	3
Film/setting up classes	1	2	3
Tangrams	1	2	3
Nimble Calculator	1	2	3

What changes would you recommend for future workshops?

_____

_____

_____

OTHER COMMENTS: _____

_____

_____

Appendix D

FAMILY SCIENCE
E V A L U A T I O N

FRIDAY, MARCH 12, 1993

Please evaluate the presentation of each of the following activities by circling the appropriate number: 3 means poor; 1 means excellent.

Activity	Excellent	Average	Poor
OPENERS	1	2	3
KNOW YOUR NEIGHBOR	1	2	3
MAKING SENSE (ITY) WITH DENSITY	1	2	3
MAGIC MAGNETS	1	2	3
MAKING SENSE	1	2	3
SPIDER	1	2	3
SCOPING CRYSTALS	1	2	3
DEMO. OF CHICK	1	2	3
PARTY WITH POLYMER'S (OOBLIC)	1	2	3
VIDEO	1	2	3

Of the activities that have been presented for which would you like more information? _____

_____

For an advanced workshop what activities would you want more information on? _____

_____

What additional information would be helpful in these workshops?

_____

_____

OTHER COMMENTS _____

_____

FS\93:EVA